The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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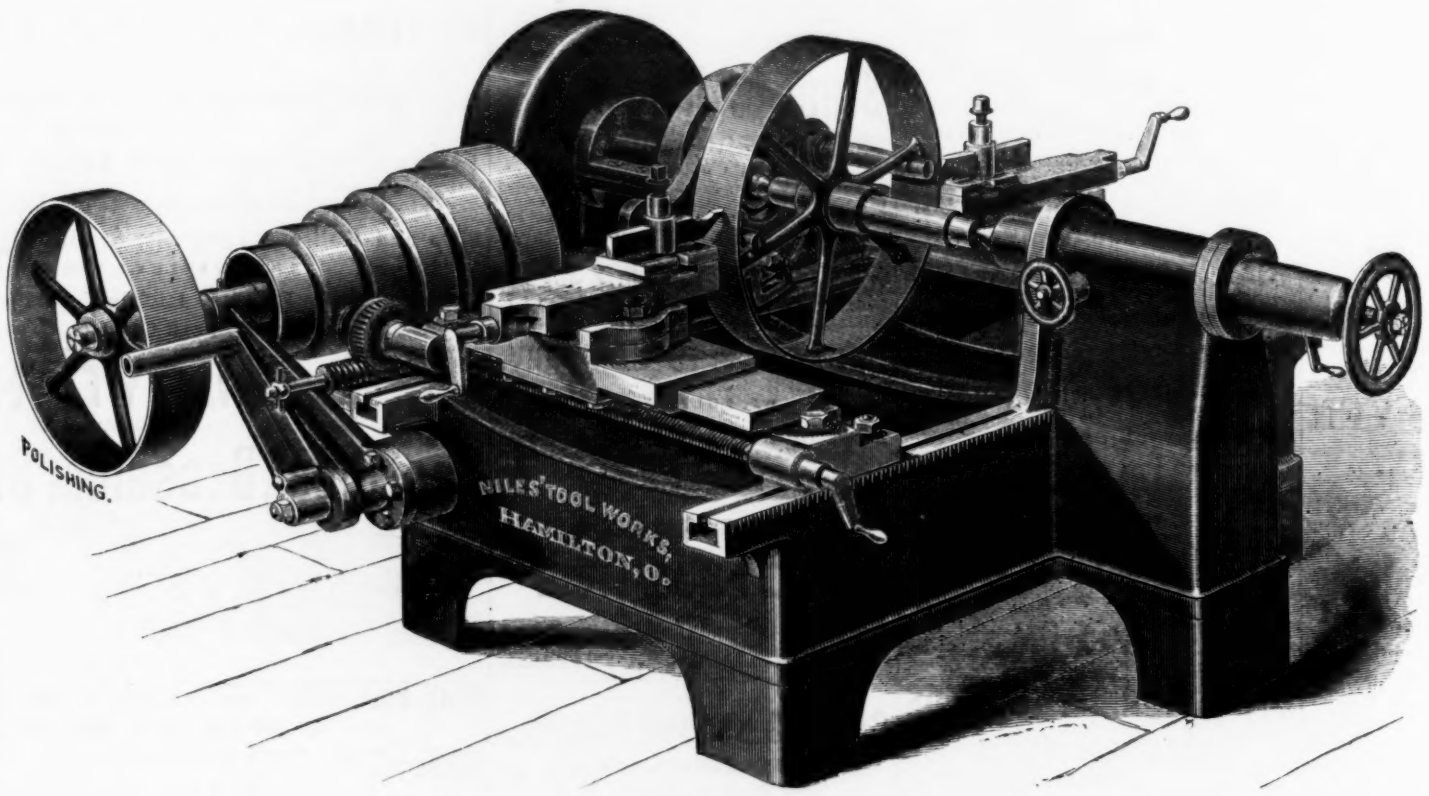
Special Pulley Lathe.

Upon this page we illustrate one of the most notable of special tools recently produced. It is from the Niles Tool Works, of Hamilton, Ohio, and is intended for turning pulleys, bevel and miter gears, rolls and work of a similar character, and will swing 50 inches. In designing this tool the aim has been to perfectly adapt the means to the end, and produce a tool especially adapted to pulley work. Heretofore, we believe, there has been nothing of the kind in the market. It has a cone pulley with six steps or speeds, transmitting the power through tangent gearing to the main spindle. The object of this is to obtain a maximum steadiness of speed for the work. In England the use of tangent gearing is highly esteemed, as tests have shown that it possesses the steadiness necessary for such work as cylinder boring or turning over interstices, as on the circumference of a mortise wheel. The latter is one of the most trying tests to which a machine can be subjected. In an ordinary lathe, when the tool is relieved from the cut and the opening or mortise is passing there is a jumping movement, which a lathe with tangent gearing does not show.

The driving plate is of the equalizing type, the driving power being distributed uniformly throughout the pulley, and unequal as well as lateral strains being obviated. Tool rests which slide in and out are placed on each side of the solid bed-piece. Their surfaces are graduated so that the diameter of the pulley to be turned can be correctly maintained; and in order to be able to get any degree of crowning, they can be set angularly. As the illustration shows, there is a tool on both sides of the object. The automatic feeds are not intermittent, but continuous, and can be rapidly engaged, disengaged or changed. In order to combine polishing with the machine, advantage is taken of the fact that the spindle of the cone pulley runs at a velocity so much higher than the main spindle that its speed is suitable for the purpose. In order to enable the operator to run the machine at the speed which experience has taught to be best for each pulley, every step of the cone is stamped with the number of the pulley for which the speed corresponding to that step is the most correct.

The lathe and a companion machine, the pulley borer, also specially designed by the Niles Tool Works, are said on good authority to be capable, together, of boring and turning six 48-inch pulleys (6-inch face) in a shift of 10 hours, which we think a good day's work.



SPECIAL PULLEY TURNING LATHE, BY THE NILES TOOL WORKS, HAMILTON, OHIO.

St. Louis as an Iron Center.—The St. Louis *Journal of Commerce* says: The obstacles in the way of making St. Louis a great and controlling center of iron production are found in the fact that the prices of the ore, the fuel, and in some cases the transportation and hauling are all too high. As the matter stands, pig iron cannot be made here for less than $20 or $22 per ton; and yet it is made in North Alabama, hauled several hundred miles, and put down here as low as $15 per ton. Unless the expenses in making iron here are reduced, the efforts to make it might as well be abandoned. It is, however, the opinion of persons who have given this important subject careful thought, that the expenses in every particular can be reduced, and the business of making iron successfully carried forward. What we need is concession on the part of the ore, the fuel-producing and the transportation interests, so as to enable the manufacturers to work at a living profit. Then, by throwing off old fogyism and bringing to bear more of energy and public spirit, the end can be accomplished. St. Louis, with all her greatness, is deficient in the two characteristics of a metropolitan city. Our leading business men, instead of adopting original and leading methods of business, are content to follow methods of other cities. Where they should be originators and leaders they are merely imitators and followers. Instead of placing business in every department upon the footing of its own intrinsic merit, they are content if they can only compete with rivals with less advantages and of fewer capabilities and resources. We let Chicago regulate our markets in grain, lumber and meat, instead of regulating it ourselves. So Pittsburgh fixes the prices of our iron and fuel, and New York of various articles, and we merely adopt them. No city can be great in progress and trade development unless its leading business minds are commanding and representative. And great results cannot be attained as long as we are content to follow the lead and dictation of others. Our position as a city justifies us in assuming leadership, and in mapping out and following the methods of business prompted both by our merits and necessities. When we do this, we can become the great trade center, not only of the iron, but of every other leading branch of commercial business. Until we do it, we must continue to occupy in many respects a subordinate position, and one far below our advantages and opportunities.

Salisbury Iron.

The following interesting data we take from a pamphlet reprinted from the *Railroad Gazette*. Nearly everyone who has been in any way connected with or interested in the mechanical departments of railroads has heard of Salisbury iron, which is made by the Barnum-Richardson Company from the ores taken from their famous old mines at Salisbury, Conn., the history of which, as well as that of the iron industry of that section of the country, was published in *The Iron Age* from a paper read at the Amenia meeting of the American Institute of Mining Engineers by Mr. A. L. Holley.

At present there are eight furnaces which, it is claimed, are the only ones that are making genuine pure Salisbury iron. The ore which is used is obtained exclusively from the Old Hill, Davis and Chatfield mines. The Old Hill bed has now been worked for over 100 years, the Chatfield for over 75, and the Davis for over 50 years. The ore is a brown hematite. The following analyses of these ores were made by Prof. C. F. Chandler of New York:

	I. Per cent.	II. Per c't.	III. Per c't,
Sesquioxide of iron	75.720	78.136	73.51
" of manganese	1.376	0.826	0.96
Silica	7.580	6.630	10.48
Sulphur	0.082	0.048	0.07
Phosphoric acid	0.032	0.501	0.57
Lime, manganese, alumina, water, &c	15.210	13.857	14.41
Equivalent to:			
Metallic iron	53.000	54.696	51.45
" manganese	0.958	0.576	0.67
Sulphur	0.082	0.048	0.07
Phosphorus	0.014	0.219	0.25

No. I is Davis ore; II, Chatfield ore; III, Old Hill ore.

Before being smelted the ore is first broken up by a Blake's stone crusher and is then washed in what is known as a Bradford "ore washer." The washed ore is smelted with charcoal exclusively. The blast for the furnace is heated up to about 400 degrees in an oven placed above the stack.

This iron is graded as Nos. 1, 2, 3, 4, 4½, 5 and 6. No. 1 is the softest grade, of which very little is made. It will not chill, and is used for cheap, ordinary castings. No. 2 is the softest or lowest grade which is produced in any quantity. It will not chill, and is used for making malleable castings in air furnaces, and is mixed with old wheels and hard or high grades of iron for car wheels. No. 3 is a somewhat harder iron, and will chill slightly in the tread of a wheel, and is much used with harder iron in the manufacture of car wheels. No. 4 is a still harder iron, and will chill about one-half inch deep in the tread of a wheel. This grade is used almost entirely for the manufacture of car wheels. No. 4½ is much used for malleable castings in cupola furnaces, and also for car wheels mixed with lower grades or softer iron. It will chill about three-quarter inch deep. No. 5 mottled and No. 6 white iron are both very hard, and will chill to almost any desired depth. In fact No. 6 has the character of chilled iron all through. These grades are used with softer iron for wheels and also for chilled rolls.

Nos. 2 and 5 are also used a great deal for making plow castings; the harder iron is mixed with that of the lower grade to give the latter the requisite hardness. By using two different grades of iron the manufacturer is able to modify and control the quality of the castings as may be required, getting the tensile strength by the use of the softer iron and the hardness with the high iron; whereas if but one kind was used, there would be no means of making castings of any other quality than that produced by the grade of iron used.

The quality or grade of the iron produced depends largely upon the temperature of the furnace at the time it is manufactured, somewhat upon the ores used, and also on the state of the weather, and probably on some causes not fully understood. When the furnace is running cold, it produces hard or high grades of iron, and the softer irons are produced by a high grade of temperature. When it is desired to produce hard iron, therefore, an increased amount of iron ore is added with a given amount of fuel; or if soft iron is required, less ore is charged. When the iron is cast into pigs several test pieces are made, which are then broken, and from an inspection of these, and also from a careful examination of the pigs themselves, the grade or number of the iron is determined.

In the manufacture of car wheels it is of the utmost importance to secure, first, the requisite strength to resist the strains and shocks to which the body of the wheel is subjected; and second, sufficient hardness in the tread and flange to stand the wear to which they are exposed.

The Salisbury iron is remarkable for possessing these qualities combined in a very high degree, and it is for this reason that it has gained its remarkable reputation and is so extensively used in the manufacture of car wheels and for other purposes in which metal of a superior quality is required. That it is a very superior iron is shown by an elaborate report made by Prof. Thurston.

Based upon a series of elaborate tests, he says: "In tenacity, both in ultimate and elastic resistances, I have been able to find no records of iron of the same grade and fusion equal to them. In all valuable qualities the Salisbury irons are exceptionally excellent. In combined strength, elasticity, ductility, resilience, and in homogeneousness, both in structure and as to strain, and in uniformity of quality in the several samples, they are proven to be very superior metals."

A tremendous explosion lately took place in the torpedo factory of the Russian government at Otchakoff, near Cronstadt, where several hundred men were employed at the time. The workshops, the naval laboratory and the storage house, containing in addition to torpedoes an immense quantity of pyroxiline, were blown to pieces and scattered to great distances. The concussion was felt for miles, and it was thought that the English had opened a furious bombardment. The powder was removed from the magazine of the garrison before the flames reached it. All houses within a circumference of two miles were more or less damaged. During the following day peasants brought fragments from a distance of five miles, and steamers arrived which had picked them up ten miles out at sea. The cause of the explosion was thought to have been spontaneous combustion. Twelve persons were killed.

Wooden Rail for Steam Roads.

We have had several questions asked us in regard to the method of building light wooden roads on which locomotives could be used. There is at the present time considerable disposition to build such roads in regions where wood is plenty and the expense of iron cannot be borne. The construction of roads of this sort has been so far reduced to practice that the locomotive builders are announcing styles of locomotives which are especially adapted to use on wooden rails. One of these firms have prepared an interesting statement of the best timber to use in these roads and how to lay them. The kind of timber to use is of course a local question to be decided according to available supplies. It is said that the best wood is maple, laid with the heart up; hard pine is used in the South. The simplest form of wooden rail is a stringer cut in 16 to 20 feet lengths, and of such cross section as the kind of wood or weight of engine requires. Six inches square stringer is the size we would generally advise, although 5 inches face by 7 inches depth is as good. Four inches face by 6 inches depth, or 5 inches square will answer for the smallest engines built for this purpose, if the wood is good; still smaller sizes may be used by placing the cross-ties close together, say 2 feet or 2½ feet between centers; for large stringers 4 feet between centers will answer. When worn out on the top the stringer may be reversed, and when again worn may be used for ties.

The ties are easiest fitted and laid if made uniform, and of about the same size lumber as the rails; 6 inches square is heavy enough. Any cheap lumber not specially liable to decay will do. Ordinary hewn ties may be used, but not being uniform are less convenient for cutting out recesses for rails. They should be at least 3 feet longer than the width of the track between rails.

The ties must be cut out accurately and uniformly to receive the rails. The recesses should be about 3 inches deep, and be at the top face of the tie 1 inch, and at the bottom of the recess 1½ inch wider than the rail. The inner faces of the recesses are perpendicular, and the distance between them is the gauge of the track. The bottom of the recess should be level, and ties laid well to afford proper bearing for the stringer.

Wedges made of any cheap wood, or better, of ends of stuff left from rails, are driven on the outsides of the rails. They are made of right shape to fit the space left; the reason for making this space wider at the bottom than at the top is to keep the wedges from working up, so that the rail may be held securely in place.

The stringers must be arranged to break joints on the ties. Both stringers should not break joint on the same tie; the stringers are sometimes sawed off diagonally instead of perpendicularly, so as to be lapped and spiked together. The lumber for a hard pine wooden road costs about $450 per mile.

With another style of wooden road the stringer is made of hemlock or any cheap lumber, and a maple strip 4 to 5 inches wide and 2½ to 3 inches thick is spiked on to the stringer. By this plan such a part of the rail as is worn out may be removed without taking up the stringer. This maple strip may be replaced by an iron T-rail considerably lighter than would be required if laid directly on cross-ties. This is strongly recommended by the locomotive builders instead of strap iron.

A wooden rail is very slippery when wet, and hard to keep clear of snow and ice in freezing weather. On very bad curves and steep grades a wooden rail is impracticable, and iron must be used.

A locomotive has but one-half or two-thirds the power on wood that it has on iron, the friction useful for traction is less, and the flange friction is greater. Locomotives for wooden rails require to be very strongly built and to be evenly balanced; the weight should be less and the drivers larger than for the same size cylinders on iron rail.

In cases where lumber is cheap and iron very dear it may be advisable to operate a wooden road, as for instance where a cheap improvement on an ordinary country wagon road is needed. To do any considerable business on the very best wooden road that can be built will, in the words of one who has tried the experiment, "require a very rich concern." Parties using animal power for hauling on a wooden rail, if content not to greatly increase the load, may effect a very considerable saving by using a locomotive. For transportation upon a scale of any magnitude wooden roads are, however, very unsatisfactory and almost impracticable.

Wrong Conclusions.

A Memphis paper has the following: "A clause ought to be added to the laws governing the running of steamboats on the Western rivers, and it should require them to be cooled down and carefully cleaned out at least once in five days during the season of high water. It is known to be a fact that the mud in boilers sometimes becomes so thick in a run from New Orleans to this point, that when the boilers cool down a stick will stand straight up in the mixture of mud and water therein; also that at times engineers are compelled to run a pole or rod up through the mud valve before the mud and water will run out after the valves are opened. Is it any wonder, then, that steamboat boilers explode? A strain such as is placed on a boiler required to generate steam to propel a heavy tow of barges up the Mississippi river against a four-mile current is very great, even when the water is comparatively free from the thick sediment and vegetable matter that settles in them after running so long a time without cleaning out. Half a dozen or more of the explosions that have happened in this vicinity during the past 10 years may be safely attributed, not to a lack of water in the boilers, but to a surplus of mud. Require engineers to lay by after a proper time to clean out, and few disasters of this kind will be recorded."

While the facts stated show a frightfully bad engineering practice, the remedy is by no means to be found in a law which directs certain things to be done. The blow should be struck at the root of the evil. Make it a crime to allow a boiler to explode, giving damages to those injured, punishing owners or engineers with imprisonment, and boilers will not explode; for engineers, firemen and owners know how to take care of boilers, and if they were to suffer personally for the results of their carelessness, they would not be long in finding means for preventing explosions.

Official returns made to the Bureau of Statistics show that during the month ended April 30, 1878, there arrived at the port of New York 8529 immigrants, of whom 5266 were males and 3263 females. There also arrived at the port during the month, 1778 passengers, of whom 1276 were citizens of the United States and 501 sojourners. The countries or places from which the immigrants arrived were: England, 1354; Scotland, 225; Wales, 32; Ireland, 1883; Germany, 2737; Austria, 219; Sweden, 422; Norway, 146; Denmark, 311; France, 108; Switzerland, 216; Spain, 56; Italy, 159; Holland, 73; Russia, 180; Poland, 105; Hungary, 30; Cuba, 26; Central America and St. Croix, 6 each; Peru, 7; Belgium, 5; Nova Scotia and Mexico, 4 each; China, Greece, Quebec, India, and born at sea, 2 each; Portugal, Newfoundland, Honduras, New Grenada and Syria, 1 each.

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SEE PAGE 9.

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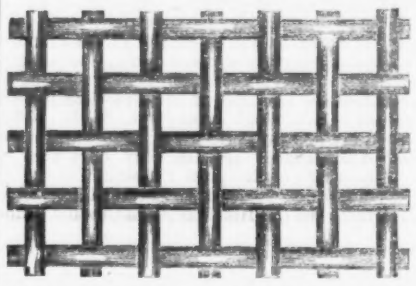

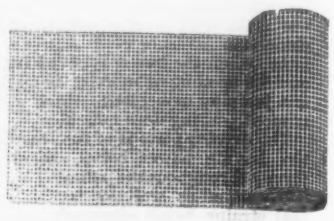

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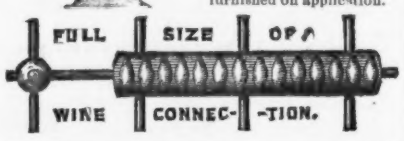

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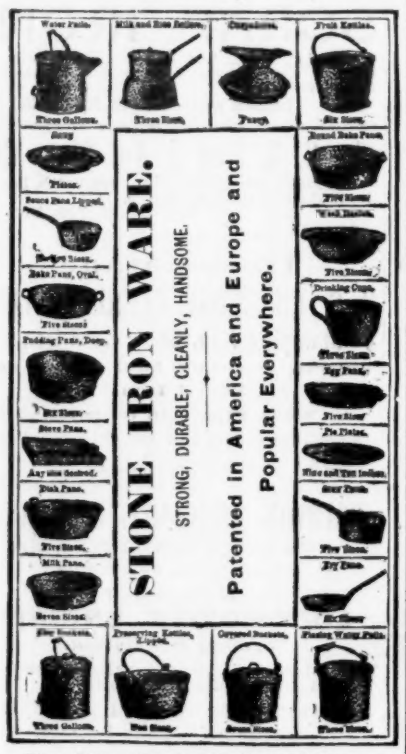

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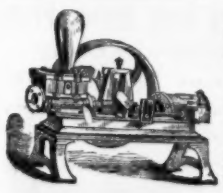

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Prices greatly reduced.
Send for circulars.
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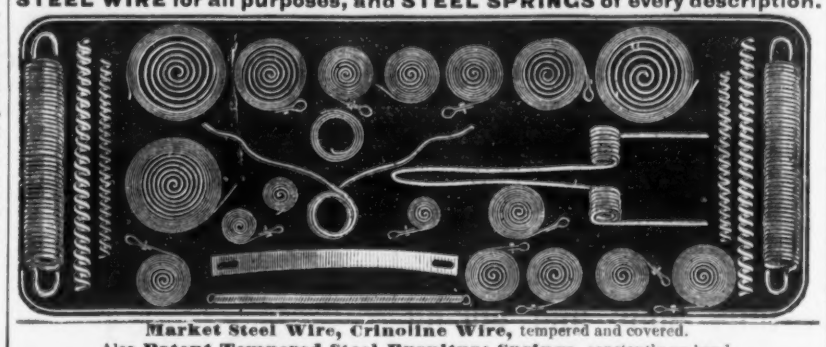

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Warranted Equal to any Produced.

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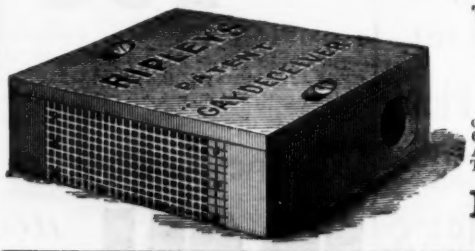

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BUY NO OTHER PATENT TRAP.
Per gross, cased, $18.00; cases free.
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THE CELEBRATED DECOY TRAP.

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106 & 108 Beekman St., N. Y.,
Manufacturer of
Wire Cloth and Netting, Moulders' Riddles, Patent Decoy Rat Traps.
The Largest Screen and Flour Sieve Factory in the United States.

Deposit of Carbon in the No. 4 Crane Blast Furnace.

In a communication to the Lafayette Chemical Society of Lafayette College, Easton, Pa., Mr. J. Gayley states that in November, 1877, the blast was taken off No. 4 furnace at the Crane Iron Works, Catasauqua, Pa., for which he is chemist, in order to place in position a new bell and to repair the arch of the gas flue leading to the boilers. The bricks forming the arch of this flue, from some cause unknown, had become disarranged to a great extent and were apparently ready to drop at any moment, so that it was found necessary to take down a portion of the furnace lining. The inner circle of fire-brick in the upper portion of the furnace was protected by a cast-iron casing, covering the exposed ends and under surfaces. At a distance of 8 feet from the furnace top, filling in between the iron casings above and the fire-brick below, was found a large deposit of carbon. This deposit did not occur in isolated spots, but rather uniformly distributed throughout the layers as far as could be observed; whether it extended to a greater depth, or the whole distance round the furnace, it was impossible to ascertain. The position of the deposit was on the front, or the side of the furnace receiving no blast, and almost directly underneath the gas flue. The courses of brick on this side of the furnace were distorted to a great extent and elevated several inches above those on the opposite side. Thus it seemed that the carbon had exerted a physical force, causing the displacement in the furnace lining and in the arch of the gas flue. No deposit was found beyond the inner circle of fire-brick, as the iron casings only extended this far. When taken from its position the mass of carbon was seen to glow, a partial combustion taking place on the surface, converting the small particles of metallic iron or lower oxides distributed throughout the mass into the peroxide. This is readily seen on examining the lumps, where on the surface small particles of the peroxide of iron are noticed gradually decreasing as we go in and finally disappearing in the interior. The carbon was found principally in the form of a powder, but occasionally aggregated into lumps. It had a uniform black color, and when rubbed on the hands resembled powdered graphite. It absorbed water readily and was slightly attracted by the magnet. The total amount of metallic iron was determined in samples taken from different portions of the mass. Two samples of the fine portion taken from different places yielded, on analysis, 4.23 and 3.23 per cent. of metallic iron. The interior of one of the lumps was also analysed; the total amount of metallic iron it contained was 2.56 per cent.; 0.35 of this existed as metallic iron, the remainder, 2.21 per cent., was combined as an oxide. The substance was free from cyanogen and chlorine. The cause of this formation was evidently due to the presence of the iron casings, as we do not find the deposit beyond the point where they extended. In the "Transactions" of the American Institute of Mining Engineers, vol. ii., Mr. Frank Firmstone called attention to a similar deposition of carbon in the blast furnace. The cause of the deposition of the carbon in the furnace at the Crane Works was doubtless the iron casings, which, when partially oxidized, effected the decomposition of the carbonic oxide in the manner first pointed out by Bell, and subsequently investigated by Gruner.

The Ore Market.

The Marquette *Mining Journal* says: If mine owners are not laying up a day of wrath for themselves in the near future it is through no fault of their own. Here we are, just in the beginning of the season, and enough ore to cover the aggregate of all sales that have been made has already been forwarded. Companies that have not sold a ton for the season's delivery have chartered vessels the same as in former years, when contracts were made before the opening of navigation, and when they were reasonably certain of a sale for any part of their product not contracted for. In the face of a depressed market, with a portion of last year's product still unsold, they have deliberately taken the position the furnace owners have long been trying to force them into—that of competition among themselves. It was formerly the practice to insist upon season contracts, so that the necessary vessel charters could be made, though the furnace owners strenuously objected to such contracts. It was, however, the only safe system for mine owners, and while objectionable in some respects the consumer was as likely to be the gainer as the loser. The ore was contracted to be delivered on the docks at Cleveland, at a certain price, extending through the season; the price was, of course, based upon the probable market value of pig iron, and if that market advanced the ore purchasers profited by it, and *vice versa*. The advantage to the mine owners was that of a certain sale, at a fixed price, and thus being able to secure vessel charters at more favorable rates than they might otherwise be able to obtain. The consumers, however, contended that the proper way was for mine owners to ship their product to the lower lake ports, thus placing it where they could buy at their convenience, and at the same time take advantage of a rise or fall in the price of iron. We regret to say that the mine owners have at last allowed themselves to be drawn into the trap set for them by the furnace owners of Ohio and Pennsylvania; they are pursuing the exact course which will place them at the mercy of consumers. With a large amount of unsold ore on the docks at Cleveland and Ashtabula, furnacemen can higgle about the price, and, pointing to the ruinous competition they have inaugurated among themselves, solemnly aver that they cannot pay a fair price for ore and keep their furnaces in blast; and the mine owners, unless able to carry their product for an indefinite length of time, will be compelled to sell at almost any price that may be offered. For, instead of controlling the market, they permit the purchasers to do it. The mill men getting into an unhealthy competition, after having glutted the market by overproduction, fall back upon the pig iron manufacturers and demand concessions in prices, so that they may be able to continue supplying an already over-stocked market. The furnacemen, not able to sell their product except at the figures offered by the mill men, and unable to carry it, concede the point and at once fall back upon the ore seller, and the latter has at last put himself into a position where, if he continues in his present course, he will have no other alternative than to yield the concessions that will certainly be demanded. It is all wrong; it is an unhealthy, unnatural condition of things, for which the miner is more responsible than the furnacemen. The remedy is in his own hands. Let him hold his product up to a fair price, and, if he cannot obtain it, either stop mining or else retain his ore at the mine until it is sold. If the furnaceman cannot pay a price for his ore that will leave a fair margin to the miner, and a profit for himself, let him take off the blast. He should be willing to act upon the basis of live and let live, and instead of contributing, as he now does, to the injury of the trade in all its branches, demand a fair living price for his iron—a price based upon actual cost, having due regard to a fair profit, and not one contingent upon the self-imposed necessities of the mill men. As it is, the mill men, by overproduction and a ruinous competition, destroy the market for manufactured iron, and then ask the furnace owner to share the loss; the furnace owner, rather than stop production, strives to throw the burden on the ore seller, and if he assumes it who is benefitted? Manifestly, no one but the consumers of the manufactured iron. We therefore assert that the remedy is with the ore producer. If he will curtail production, and hold the ore he does mine up to a fair price, refusing to ship any of it before it is sold, the tendency will be to correspondingly curtail the make of pig iron, and that will have its effect on the mills; in other words, we mean to say that if the mill men will limit their product to a healthy demand, prices will be enhanced to the extent of enabling them to pay a price for pig metal which will take into consideration and have proper regard to the profits which should justly accrue to the producer of the raw material.

Labor and Wages in the Lehigh Coal Field.

The Hazleton *Sentinel* gives the following information on mining operations in the Lehigh region:

Yesterday we found the following places at work: Coleraine, No. 2; Jeanesville, Nos. 4 and 5; Beaver Brook, No. 2; Tresckow, all; Yorktown, all; Honeybrook, No. 1. Some of the idle will work a few days next week. It is said that the complement for this month will not give as much work as was done in April, for which month we find that Coleraine No. 1 worked 11 days and 8 hours; No. 2, 5 days; Tresckow worked none; Beaver Brook No. 1 worked 2 days; No. 2, 10¾ days; Yorktown about 9½ days at both collieries; Honeybrook, 10 days at Nos. 4 and 5; none at No. 1; Jeanesville, No. 4, 5 days; No. 5, 14 days. The wages for the month of May will be the same as for April, which were as follows in Beaver Brook, which is about the general rate in the region, except the contract prices for big vein: Company miners, $9.92 per week; inside laborers, $8.16; general outside laborers, $1.05 per day; platform men, $1.20 per day; contract mining price, 79 cents per two-ton car. At another place we find 67 cents per car for big vein. In answer to our query, a Beaver Brook miner said they could "not average four cars per day, because they could not get the cars," owing, we suppose, to a surplus of miners. If we average the work of four cars per day for the 10¾ days worked, or 43 cars at 79 cents per car, the sum will be $31.97, of which the miner will have left $17.35 after paying his laborer, and from this sum his expenses will have to be taken, about $4, which leave him about $13.35 for 10¾ days work. A Coleraine miner in the Wharton vein says: "We can average six cars a day for the time we are now working, but we work when the breaker is idle preparing, so that we can make a day's wages when it works, or as near a day's wages as we can with the prices." This miner, after paying his laborer $16.32 for two weeks' work, would have about $27 clear of expenses for two weeks' work, which don't include the time he works when he sends out no coal. The Big Vein miners do about as well, or may be a little better, than the Wharton men. Their pay per car is not as much, but their work for the same amount of coal is a great deal easier and not so expensive, and as a general thing they can load from one to two cars per day more than the Wharton miners, "if" they can get the cars.

Opposition of English Workmen to the Introduction of Machinery.—Messrs. Ward & Payne, edge tool and sheep shear manufacturers of Sheffield, have given the whole of the sheep-shear forgers and grinders in their employ a month's notice to quit their service. The firm have recently paid great attention to two leading markets for sheep shears—Australia and South Africa. Both these markets require a superior class of shears. Another market, that of South America, takes an inferior, and consequently cheaper shear, which another firm make by machinery. That firm has done a large business in South America. Messrs. Ward & Payne determined to enter the market, but as it was impossible to offer hand-forged goods at the same price as those done by machinery, the grinders were required to state at what rate they would grind machine-made shears. The reduction required by the firm was indicated at 30 per cent., but the men declined to accede. Mr. Ward has arranged for the necessary machinery, and has informed the men that he is not tied to Sheffield, but that if he cannot have his work done at rates which will enable him to compete with other firms, he will transfer the trade to one of the Midland towns, probably Birmingham. The men dislike the use of machinery, and although they do not decline on this ground ostensibly, there is no doubt that with all the experience they have had of American success in manufacturing by machinery, they are still prepared to resist its introduction wherever they can.

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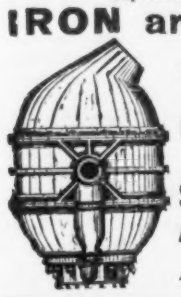

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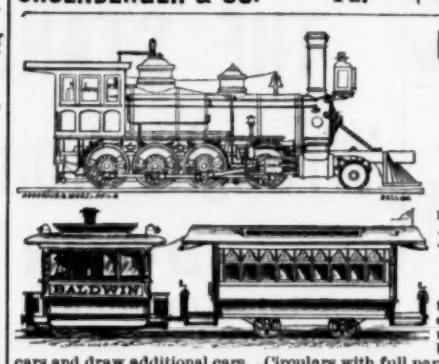
The U. S. Iron & Tin Plate Co.
OFFICE: 112 Smithfield St., Pittsburgh, Pa.
WORKS at Demmler Station
B. & O. R. R., Pgh., Div.
MANUFACTURERS OF THE
Home Made
U. S. CHARCOAL TERNE PLATES,
Stamping Iron, Show Card Iron,
Taggers, Bessemer Steel Plates and Shovel Iron.
Stove Pipe Iron cut to size.
Special sizes of Pickled and Cold Rolled Iron made to order.
Send for specification and price list.



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BURNHAM, PARRY, WILLIAMS & CO., Proprietors,
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Manufacturers of
LOCOMOTIVE ENGINES
of every Description.
Catalogues, photographs and estimates furnished on application of customers.
NOISELESS STEAM MOTORS,
For city and suburban Railways.
These machines are nearly noiseless in operation; show no smoke with the use of anthracite coal or coke as fuel, and show no steam whatever under ordinary conditions of service. They can be run at two or three times the speed of horse cars and draw additional cars. Circulars with full particulars supplied.

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ESTABLISHED 1828.
ZUG & CO.,
Our Rolling Mill and Nail Factory having been remodeled, possess all modern improvements and facilities for the manufacture of Iron and Nails, enabling us to place on the market goods of a superior quality and finish. Our Nails are selected by the use of "Coyne's Automatic Nail Picker." Our Iron is especially adapted for uses when quality is a consideration, and by the use of our Universal Mill we are able to fill orders of odd sizes of Iron with promptness.
OFFICE and WORKS: Etna and 13th Streets Pittsburgh, Pa.

POTTSVILLE SPIKE, BOLT AND NUT WORKS.
RAILROAD SPIKES, MINING SPIKES,
MACHINE FORCED NUTS,
MACHINE BOLTS, TRACK BOLTS &c.
GEO. D. ROSEBERRY, Manufacturer, Pottsville, Pa.

LEECHBURG IRON WORKS.
KIRKPATRICK, BEALE & CO.
Manufacturers of all grades of
FINE SHEET IRONS,
(Refined, Cold Rolled, Show Card, Stamping, Tea Tray, Polished, Shovel.
TIN AND TERNE PLATES, made with Natural Gas as fuel.
OFFICE, No. 116 Water St. Pittsburgh, Pa. WORKS, Leechburg, Pa.

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MANUFACTURERS' AGENTS AND DEALERS IN
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SHEET and TANK IRON—BOILER, TANK and SAFE RIVETS,
Best Lap-Welded Iron Boiler Tubes,
Wrought Iron Girder, Deck & Channel Beams,
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"WALKER'S" FORGED AND HAMMERED HORSE SHOES
FRED. A. HOUDLETTE, *Formerly with Bay State Iron Co.*
WM. R. ELLIS, *Treas. Boston Rolling Mill*

Iron.

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Siemens' Regenerative GAS FURNACE.

RICHMOND & POTTS,

119 S. Fourth St., PHILADELPHIA, PA.

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Dealers in

Scrap Iron & Metals, Machinery, Tools, Shafting & Pulleys Steam Engines, Pumps & Boilers Copper, Brass, Tin, Babbit Metals, Foundry Facings. Best Quality Ingot Brass.

Cash paid for all kinds of **Metals** and **Tools.**

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Importers of

Old Iron, Metals and Rags.

Freight engagements made to all parts of the world. Marine insurance effected in reliable offices.

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Old Rails, Axles, and Wheels bought and sold.

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MINERS AND SHIPPERS OF

Magnetic Iron Ore.

The "BLUE" (Red Short) and "RED" (Neutral) Bessemer Ores, from Hacklebarney and Chester, New Jersey.

Price "Blue" Ore hand-broken and selected for April is $2.50 cash, f. o. b. Hacklebarney Mines.

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Having enjoyed for over TWENTY YEARS the reputation of producing the best quality of

RAILS,

have now an annual capacity of

100,000 Tons of Iron and Steel Rails, Splice Bars, &c.

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Wrought Iron Roof Trusses, Beams, Girders & Joists,

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DECK BEAMS, CHANNEL, ANGLE AND T BARS

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For Top and Bottom Chords of Bridges.

Railroad Iron, Street Rails, Rail Joints and Wrought Iron Chairs.

REFINED BAR, SHAFTING, and every variety of SHAPE IRON made to Order.

Plans and Specifications furnished. Address,

SAMUEL J. REEVES, President.

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LOCOMOTIVE AND CAR WHEEL TIRES,

Manufactured from the celebrated OTIS STEEL.

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STANDARD.

Quality and efficiency fully guaranteed. Prices as low as any of the same quality.

We manufacture

Heavy and Light Forgings, Driving and Car Axles, Crank Pins, Piston Rods, Etc.

Works at Lewistown, Pa. **Office, 220 S. 4th St., Philadelphia, Pa.**

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JAS. ROWLAND & CO.,

Kensington Iron, Steel & Nail Works,

920 North Delaware Ave., - - PHILADELPHIA,

Manufacturers of the

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Also, the James Rowland & Co. Kensington Nails, cut from their Refined Anvil stock. Also, Plow and Cultivator Steel, Rounds, Squares, Flats, Bands and Hoop Iron.

Correspondence with Dealers solicited.

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Manufacturers of

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Office, No. 265 S. Fourth St., Philadelphia. Agents for the sale of Glamorgan Pig Iron.

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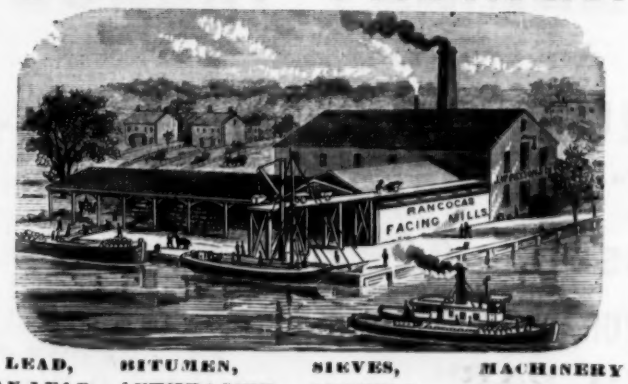

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GERMAN LEAD,	BITUMEN,	SIEVES,	MACHINERY SAND,
AMERICAN LEAD	ANTHRACITE,	SHOVELS,	BRASS "
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PLUMBAGO,	MINERAL,	CRUCIBLES,	STOVE PLATE "

J. W. PAXSON & CO. *OFFICE & STOREROOMS, 514, 516 and 518 Beach St., Philadelphia, Pa.*

Iron.

H. E. COLLINS. JAS. H. MURCOCK.

H. E. COLLINS & CO.,

BROKERS IN

Manufactured

IRON, NAILS

AND

STEEL,

Pig Iron, Iron and Steel Rails,

METALS,

Railway Supplies, Old Rails and Railway Scrap,

PITTSBURGH, PA.

Edward J. Etting,

IRON BROKER AND COMMISSION MERCHANT,

230 S. Third St., Philadelphia, Pa.

CENTRAL IRON WORKS, - Harrisburgh, Pa.

Boiler Plate, Tank Iron, &c.,

PIG, BAR AND RAILROAD IRON,

Old Rails, Scrap, &c.

STORAGE WHARF & YARD,

DELAWARE AVENUE ABOVE CALLOWHILL STREET, connected by track with railroad

Cash advances made on Iron.

The Iron-Masters' LABORATORY.

Exclusively for the

Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.

No. 339 Walnut St., Philadelphia.

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This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

CHARGES TO IRON WORKS.

For determining the per cent. of Pure Iron in an ordinary Ore	$4.00
For the per cent. of Pure Iron, Sulphur and Phosphorus in do	12.50
For each additional constituent of usual occurrence	1.50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.	
For determining the per cent. of Sulphur or Phosphorus in Iron or Steel	7.00
For each additional constituent of usual occurrence	5.00
For the per cent. of Carbonate of Lime, and insoluble Silicious Matter in a Limestone	10.00
or each additional constituent	2.00
or the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal.	12.50

For determining the constituents of a Clay, Slag, Coke, or of an Ash in Coal the charges will correspond with those for the constituents of an ore.

For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.

Printed instructions for obtaining proper average samples for analysis furnished upon application.

BOSTON ROLLING MILLS

Manufacture

Extra quality small Rods, from best selected Scrap Iron

SWEDISH AND NORWAY SHAPES,

Nail and Wire Rods. Also,

Horse Shoe Iron, Hand Made Horse Shoes & the Boston Horse Shoe.

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NEW CASTLE, PA.,

Manufacturers of every description of

PLATE & SHEET IRON

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Iron, Nails & Spikes.

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COMMISSION AGENTS,

PIG IRON

Blooms, Bar, Sheet & Hoop Iron.

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PATENT MINERAL WOOL,

The Best and Cheapest Non-Conductor or Insulator of Heat or Cold.

Used for covering steam pipes, boilers; for lining water pipes, hydrant and street washer boxes, refrigerators, cold storage houses, &c. Cheap enough for deafening walls of dwellings, factories, &c. State rights for sale. Send for circular to

ALEXANDER D. ELBERS,

No. 26½ Broadway, N. Y., P. O. Box 4461

BORAX.

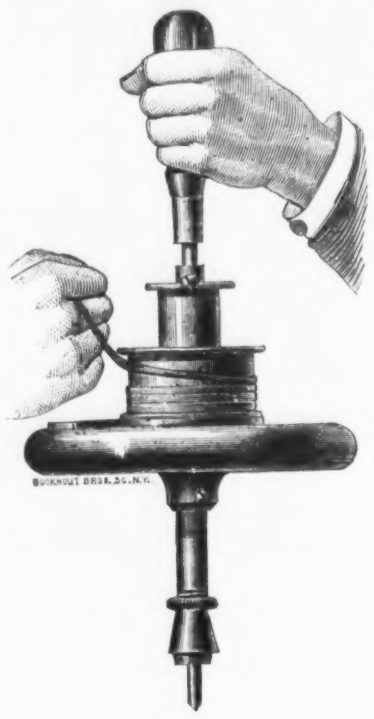
Concentrated Borax in sacks.
Selected concentrated Borax in barrels.
Refined Borax in cases.
Pulverized Borax in barrels.
Pulverized Borax in pound and half pound packages.
Being *Sole* Agents for *Messrs. Smith Bros.*, OWNERS OF THE MINES, we are enabled to sell at the *lowest prices.*

WM. T. COLEMAN & CO.,

NEW YORK, 180 Pearl Street.
SAN FRANCISCO, CAL., cor. California and Front Sts.

Quick Speed Hand Drill.

Our engraving represents a new and useful tool for light drilling in wood or metal, invented by Mr. C. L. Bellamy, of Arlington, N. J. Its chief parts are a fly-wheel carrying the drill, and a pulley spring and clutch mechanism, all of which revolve loosely on a spindle held stationary by a handle. The action is as follows: By drawing with one hand a string wound around the drum, the latter and the clutch, together with the fly-wheel and drill, are set in motion at a certain speed. At the same time the spring attached to the drum is tightened. As soon as the tension of the hand holding the spring is relaxed, the movement of the pulley is reversed, taking up the slack at the same time. The fly-wheel and the drill do not, however, take part in the reversal of the motion, owing to the action of the clutch.



A continuous revolving movement in one direction is thus insured for the drill, the speed varying from 500 to 1000 revolutions per minute. The necessary feed may at all times be felt, and be accordingly controlled by the hand grasping the handle. The drill may be used in any position, and drills of any kind can be inserted.

By the use of two simple attachments which are not shown in the cut, the instrument can be so arranged that it may be operated with one hand. Another attachment is provided by which the drill can be worked by hand or foot; this consists of a bracket for holding the drill, converting it into a tool similar to a small lathe. The bracket is held by inserting the bottom in the jaws of an ordinary vise. In this case the drill can be used for polishing. The tool is a very neat and effective one, and seems capable of doing a pretty wide range of work.

New York's New Fire-Alarm Telegraph.

The new fire-alarm telegraph apparatus which has for some time past been in course of erection at Firemen's Hall, New York, is now in practical operation, and is to-day open to public inspection.

The system of telegraphy employed is a blending of the system formerly used with all the improvements added which experience and science could suggest, the whole adapted by Superintendent John H. Emrich and his deputy, J. Elliott Smith. The apparatus was built by Pierce & Jones, and cost, with the cabinets, over $10,000. An idea of this beautiful but complex electrical machinery may be gained from the following: The fire-alarm system comprises 60 circuits of 120 wires. There are 550 street boxes and 85 points to which alarms are transmitted from headquarters, including engine and truck houses, the quarters of the Chief Engineer, Police Headquarters, the Fire-Boat Havemeyer, &c. The great bunches of wires are carried into the loft of Firemen's Hall from two enormous poles in front. In the loft are situated the "lightning arresters."

The wires pass downward from the "lightning arresters," through the ceiling to the main switch-board. This is of marbleized slate, 16 feet long by 3 feet wide, and contains 800 switches. All wires diverge from this. At this point also each wire is supplied with the necessary battery power. The tests are likewise made upon it. On each circuit is a galvanometer, which indicates at all times the condition of the circuit and strength of the battery. Should an outside disturbance occur on any wire it is immediately shown by the little needle of this galvanometer. The existence of the disturbance ascertained, the wire is at once switched to an electrical measuring instrument, where, by means of a rheostat, the location of the trouble is accurately determined. From the switch-board all the street-box wires pass under the platform to the opposite side of the room, there they pass through a relay, Morse key and electrical annunciator. This relay is the direct medium of reception of all fire-alarm signals. The register or recording instrument is situated also on this side of the room. This instrument has 50 recording pens, which print the signal in ink on paper. On this side of the platform also are the fire-box switches, one upon each street-box circuit. By a single movement of any of these levers a fire signal may be sent from a street box direct and sounded upon a small instrument in each company quarters. The transmitters, which are used for the purpose of sending alarms and striking them upon the large gongs in company quarters, are three in number and are placed upon pedestals in the center of the platform. Two of these have been for some years in use. They performed their work well, but another and a larger machine was added to meet the requirements of the service. The new transmitter is understood to be the largest and most complete ever built. By one setting of the indexes any combination of signals now in use by the department, or that may hereafter be required, may be sent out in a vastly shorter space of time than has been heretofore consumed.

There has also been added an improved automatic gong circuit tester. By its aid each of the gong circuit wires is automatically tested as to its condition, and a record made of the fact both by means of an annunciator and a registering pen in ink.

An alarm is received and sent out in the following manner: When a street box is pulled for a fire the circuit on which it is situated is at once indicated on the annunciator, and the signal number sounded on a bell and recorded by the register, which is started in motion by the action of the street box itself. The operator immediately pulls down the lever of the circuit which is working, and this movement taps the signal on all the small instruments of the engine and truck houses without the loss of an instant of time. In the meantime the assistant operator has prepared the transmitter, and the operator at once starts it. This rings all the big gongs, which, on account of their size, necessarily ring somewhat slower than the small ones. On the opposite side of the platform is an extensive system of machinery for testing the wires, batteries, &c. Each one of the articles of machinery described above is duplicated; so that in case of failure from any cause by a single movement of a switch the injured one is thrown out and the duplicate instantly put in its place. Delay is thus rendered impossible. The battery room on the ground floor is connected by 200 wires to the switch board of the operating room, and employs 1250 battery cells. It is thought that these improvements have brought the fire telegraphic system of this city as near perfection as possible.

Combustibility of Oils.

A New England Insurance Company have issued the following circular:

A compilation of the incidents of fires in factories during the last sixteen years, of which the secretary of this company has kept a careful record, indicates that the precautions taken to prevent loss from fires that have taken place from unavoidable causes have been so adequate as to have reduced the aggregate of such unavoidable losses to a very small portion of the whole loss that has accrued in that period.

The most disastrous losses have occurred from avoidable causes. 1. The misuse and consequent breaking down of adequate apparatus for the extinction of fire. 2. The breaking of unfit lanterns carried by watchmen or mechanics employed in night work. 3. Friction from the use of unfit oil for lubricating. 4. Spontaneous combustion (so called) caused by neglect to remove waste, or from the use of dangerous oils.

The object of the present inquiry is in respect to oil. It is believed that if the facts which have come within the cognizance of those who are in the direct charge of the factories can be collected and compared, some valuable data may be obtained from which a true theory may be constructed by scientific students. In this attempt your advice is earnestly requested, to the end that no unreasonable requirements may be made in the conduct of insurance, and that the safety of each and all may be promoted. More than one-third of all the losses of this company, since its beginning, can be traced directly to fires that have been caused by spontaneous combustion (so called) or by friction, the former being the chief cause of loss.

With this view we ask information on the following points:

Oil for Lubricating.—1. What is needed? 2. What are the faults in oils of which you have had experience? 3. To what cause do you attribute these faults? 4. In respect to mineral oils or to mixed oils, what is your experience? Please name the kinds used. 5. To what extent have you found low-priced oils dangerous to use? 6. Can low price and reasonable safety be in any way way combined? 7. What experience have you had in respect to spontaneous combustion, so called? 8. Have the oils used by you been put to any special tests by yourself? If so, will you please describe them? 9. Do you believe it to be possible to use a pure mineral oil for lubrication with economy and safety? 10. If you have discovered fraud or deception, please state the facts.

Oil for Working Wool.—1. What is needed? 2. What are the faults in oils of which you have had experience? 3. To what cause do you attribute these faults? 4. In respect to mineral or mixed oils, what has been your experience? Please name the kinds used. 5. To what extent have you found low-priced oils to be costly? 6. Or dangerous? 7. Can low price be combined with safety? 8. Have you ever known spontaneous combustion to happen where oil, mostly mineral, has been used? 9. Can you combine freedom from spontaneous combustion with a non-inflammable quality of oil? 10. Have you had any experience in the use of other compounds than oils or grease in preparing wool? 11. Do you prefer animal, vegetable, mineral or mixed oils for wool? Please give reasons. 12. Have the oils used by you been specially tested before purchase? If so, please describe the tests and results. 13. If you have discovered fraud or deception, please state the facts.

We intend to submit the statements of facts that may be obtained in answer to this request to a thorough analysis by the most competent men.

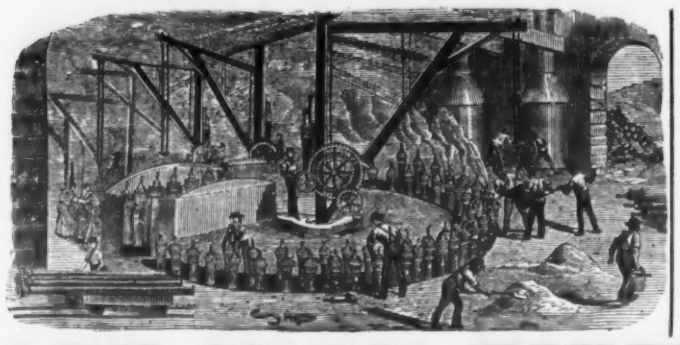
Secretary Evarts has sent a circular to consular officers, requesting reports upon the following subjects: 1. The price of labor among laborers of all classes. 2. The cost of living of the laboring classes. 3. A comparison of the present cost of living and the rates of wages with that of the last 10 years. 4. The cost of produce and its market prices. 5. The amount of paper money in circulation and its "real" value in gold and silver, together with its fluctuations during as many years as can be accurately obtained, and the causes which have produced fluctuations.

Iron.

McNEALS & ARCHER,

BURLINGTON, N. J.

Flange Pipes.



General Foundry Work.

CAST IRON PIPES

FOR WATER AND GAS.

JAPANNERS. DECORATORS.

Light Castings and Metal Patterns

A SPECIALTY.

TAYLOR & BOGGIS,

Iron Founders,

Nos. 65, 67, 69, 71 & 73 Central Way, CLEVELAND, O.

CORRESPONDENCE SOLICITED.

Will make estimates on completed work when desired.

FLORENCE OIL STOVES.

Cook with Patent Top.

Double Cook.

THE ONLY SAFE, DURABLE AND ODORLESS OIL STOVE MADE.

No. 0 Cook.

EXAMINE THIS AND BUY NO OTHER.

Liberal Discounts to the Trade.

SEND FOR CIRCULAR.

MANUFACTURED BY

THE FLORENCE MACHINE COMPANY,

Florence, Mass.

PRINCIPAL OFFICES: 39 Union Square and 42 Murray Street, New York; 476 Washington St., Boston; 59 State St., Chicago; 1210 Ridge Ave., Philadelphia; 84 Wood St., Pittsburgh, Pa.; 67 Arcade, Providence, R. I.; 267 Middle St., Portland, Me.

Universally acknowledged to be without an equal as a Kitchen Sink. Send for Descriptive Circular and Prices.

BUHRER'S

Infallible Sewer Gas Trap

A SURE AND EFFECTIVE SEAL

Against Sewer Gas.

The annexed cut represents the construction of this Trap, the essential feature of which is the **Valve** (D), made of pure rubber, treated so as to resist the action of Sewer Gas, &c. The upper end of this valve has a collar around it, which is fastened between the flanges (B) of the case and hangs loosely, suspended from the top, thus securing the easy and rapid passage of waste and water through it, after which the sides of the valve come together and form a perfect and effective seal. The case (A) which contains the valve is made of cast iron, enameled on its inner surface, and is constructed so as to form a rest for the valve and facilitate its instant closing.

S. BUHRER, Inventor & Manufacturer,

Cleveland, O.

WHOLESALE AGENTS.

W. & J. B. GIBSON, 17 and 19 East Ninth St., Cincinnati, O.
L. WOLFF MFG. CO., 109 and 111 West Lake St., Chicago, Ill.
HAMBLIN & MATHEWS, 82 and 84 North St., Boston, Mass.
C. A. BLESSING, 44 North Fifth St., Philadelphia, Pa.
THE J. L. MOTT IRON WORKS, 88 & 90 Beekman St., New York.

Please send for circular.

Southern Advertisements.

Southern States Coal, Iron & Land Co.

LIMITED,

ENGINEERS, IRON FOUNDERS & BOILER MAKERS,

Coal Miners and Fire Brick Manufacturers.

The Only Makers in the Southern States of

WASHED FOUNDRY COKE,

Free from Slate and Sulphur.

Machine-Made Brick, Limestone, Lumber and Shingles.

FARMS TO LET.

Apply to the **HEAD OFFICE, South Pittsburg, Tennessee.**

W. A. HOSKINS,

DEALER IN

MINERAL LANDS,

Chattanooga, Tenn.

Offers for sale, at very low figures, some of the most valuable Charcoal and Coke Properties within the district. Full particulars furnished on application.

Vulcan Iron & Nail Works,

Chattanooga, Tenn.,

MANUFACTURERS OF

BAR IRON, NAILS, RAILROAD SPIKES, FISH BARS AND BOLTS BRIDGE AND CAR BOLTS, AND FORGINGS GENERALLY.

ROANE IRON COMPANY,

Manufacturers of and Dealers in

Pig and Railroad Iron.

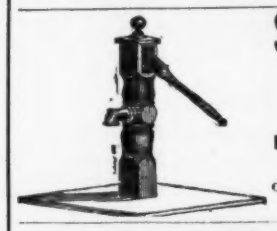
CHATTANOOGA, - - - - TENN.

WASON CAR & FOUNDRY COMPANY,

Chattanooga, Tenn.,

Manufacturers of

RAILWAY FREIGHT CARS, Car Wheels and Castings.



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MAKERS OF

Plain and Porcelain Lined Pumps.

Patent Improved Rubber Bucket Chain Pumps.

Pump Material in the rough or in the white. The very best quality of work at lowest prices.

CHATTANOOGA, TENN.

T. J. BROWN,

Rockwood, Tenn.

Miner and Contractor of Fossiliferous Ores.

A superior article delivered at low figures at any furnace within the district or at any point on the Ohio River. Refer to Roane Iron Co., Chattanooga Iron Co., or S. B. Lowe, Chattanooga.

S. B. LOWE,

Pig Iron, Storage & Commission.

Dealer in Charcoal and Coke Pig Iron for Foundry, Forge or Car Wheel purposes.

Chattanooga, Tenn.

CHAMPION BARROWS.

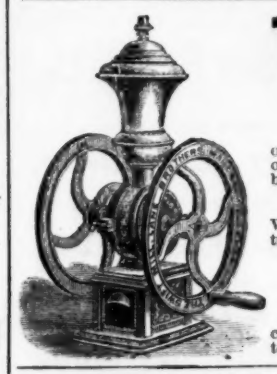
WITH WOOD OR IRON WHEELS.

A first-class article and a specialty, that will make a demand in any market and afford a good margin for dealers. We are prepared to furnish them in large quantities. Manufactured by

BRYAN MANUFACTURING CO., Bryan, O.

SEMPLE & BIRGE MFG. CO., Sole Western Agents, ST. LOUIS, MO.

For Sale by THE NEW YORK PLOW CO., General Eastern Agents, 55 Beekman St., New York.



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ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship of the very best. We make more than 30 styles.

ALSO LANE'S PORTABLE COFFEE ROASTER

Will roast 30 to 40 lbs. at once, and can be used as a stove at other times. Send for descriptive list to Manufacturers.

LANE BROS., Millbrook, N. Y.

Also sold by leading wholesale houses.

Our agents, Graham & Haines, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at Factory prices.

STANDARD NUT CO.,

Pittsburgh, Pa.,

MANUFACTURERS OF

HOT PRESSED

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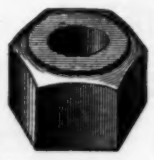

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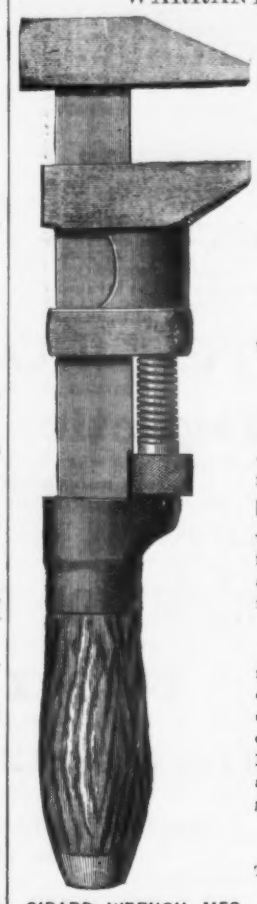

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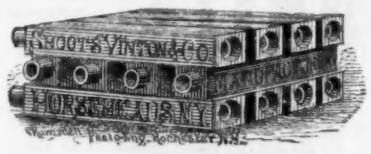

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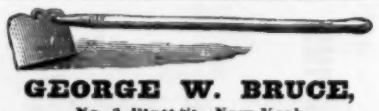

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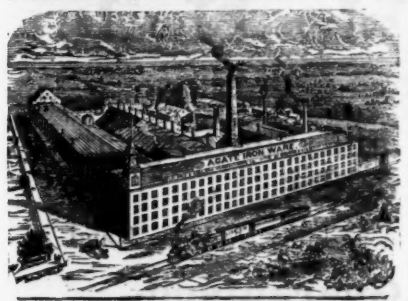

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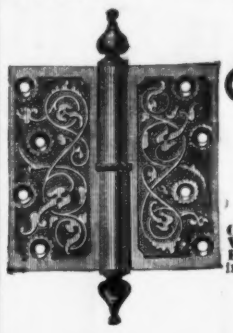

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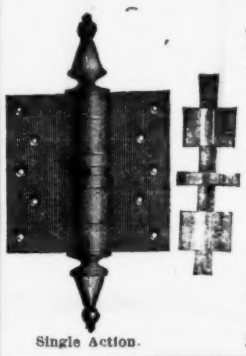

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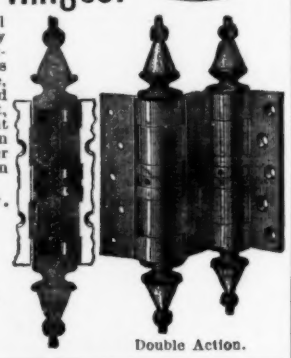

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On Welding.*

The generally received theory of welding is that it is merely pressing the molecules of metal into contact, or rather into such proximity as they have in the other parts of the bar. Up to this point there can hardly be any difference of opinion, but here uncertainty begins. What impairs or prevents welding? Is it merely the interposition of foreign substances between the molecules of iron, or of iron and any other substance which will enter into molecular relations or vibrations with iron? Is it merely the mechanical preventing of contact between molecules, by the interposition of such substances? This theory is based on such facts as the following:

1. Not only iron but steel has been so perfectly united that the seam could not be discovered, and that the strength was as great as it was at any point, by accurately planing and thoroughly smoothing and cleaning the surfaces, binding the two pieces together, subjecting them to a welding heat, and pressing them together by a very few hammer blows. But when a thin film of oxide of iron was placed between similar smooth surfaces, a weld could not be effected.

2. Heterogeneous steel scrap, having a much larger variation in composition than these irons have, when placed in a box composed of wrought iron side and end pieces laid together, is (on a commercial scale) heated to the high temperature which the wrought iron will stand, and then rolled into bars which are more homogeneous than ordinary wrought iron. The wrought-iron box so settles together as the heat increases that it nearly excludes the oxidizing atmosphere of the furnace, and no film of oxide of iron is interposed between the surfaces. At the same time the inclosed and more fusible steel is partially melted, so that the impurities are partly forced out and partly diffused throughout the mass by the rolling.

The other theory is that the molecular motions of the iron are changed by the presence of certain impurities, such as copper and carbon, in such a manner that welding cannot occur or is greatly impaired. In favor of this theory it may be claimed that say 2 per cent. of copper will almost prevent a weld, while, if the interposition theory were true, this copper could only weaken the weld 2 per cent., as it could only cover 2 per cent. of the surfaces of the molecules to be united. It is also stated that 1 per cent. of carbon greatly impairs welding power, while the mere interposition of carbon should only reduce it 1 per cent. On the other hand, it may be claimed that in the perfect welding due to the fusion of cast iron, the interposition of 10 or even 20 per cent. of impurities, such as carbon, silicon and copper, does not affect the strength of the mass as much as 1 or or 2 per cent. of carbon or copper affects the strength of a weld made at a plastic instead of a fluid heat. It is also true that high tool steel, containing 1½ per cent. of carbon, is much stronger throughout its mass, all of which has been welded by fusion, than it would be if it had less carbon. Hence copper and carbon cannot impair the welding power of iron in any greater degree than by their interposition, provided the welding has the benefit of that perfect mobility which is due to the fusion. The similar effect of partial fusion of steel in a wrought-iron box has already been mentioned. The inference is, that imperfect welding is not the result of a change in molecular motions due to impurities, but of imperfect mobility of the mass—of not giving the molecules a chance to get together.

Should it be suggested that the temperature of fusion, as compared with that of plasticity, may so change chemical affinities as to account for the different degrees of welding power, it may be answered that the temperature of fusion in one kind of iron is lower than that of plasticity in another, and that as the welding and melting points of iron are largely due to the carbon they contain, such an impurity as copper, for instance, ought, on this theory, to impair welding in some cases and not to affect it in others.

The next inference would be that by increasing temperature we chiefly improve the quality of welding. If temperature is increased to fusion, welding is practically perfect; if to plasticity and mobility of surfaces, welding should be nearly perfect. Then how does it sometimes occur that the more irons are heated the worse they weld?

1. Not by reason of mere temperature, for a heat almost to dissociation will fuse wrought iron into a homogeneous mass.

2. Probably by reason of oxidation, which, in a smith's fire especially, necessarily increases as the temperature increases. Even in a gas furnace a very hot flame is usually an oxidizing flame. The oxide of iron forms a dividing film between the surfaces to be joined, while the slight interposition of the same oxide, when diffused throughout the mass by fusion or partial fusion, hardly affects welding. It is true that the contained slag, or the artificial flux, become more fluid as the temperature rises, and thus tend to wash away the oxide from the surfaces; but inasmuch as any iron with any welding flux can be oxidized till it scintillates, the value of a high heat in liquefying the slag is more than balanced by its damage in burning the iron.

3. But it still remains to be explained why some irons weld at a higher temperature than others; notably, while irons high in carbon or in some other impurities can only be welded soundly by ordinary processes at low heats. It can only be said that these impurities, as far as we are aware, increase the fusibility of iron, and that in an oxidizing flame oxidation becomes more excessive as the point of fusion approaches. Welding demands a certain condition of plasticity of surface; if this condition is not reached welding fails for want of contact due to mobility; if it is exceeded, welding fails for want of contact due to excessive oxidation. The temperature of this certain condition of plasticity varies with all the different compositions of irons. Hence, while it may be true that heterogeneous irons, which have different welding points, cannot be soundly welded to one another in an oxidizing flame, it is not yet proved nor is it probable that homogeneous irons cannot be welded together, whatever their composition, even in an oxidizing flame. A collateral proof of this is that one smith can weld irons and steels which another smith cannot weld at all, by means of a skillful selection of fluxes and a nice variation of temperatures.

To recapitulate. It is certain that perfect welds are made by means of perfect contact due to fusion, and that nearly perfect welds are made by means of such contact as may be got by partial fusion in a non-oxidizing atmosphere or by the mechanical fitting of surfaces, whatever the composition of the iron may be within all known limits. While high temperature is thus the first cause of that mobility which promotes welding, it is also the cause, in an oxidizing atmosphere, of that "burning" which injures both the weld and the iron. Hence, welding in an oxidizing atmosphere must be done at a heat which gives a compromise between imperfect contact due to want of mobility on the one hand, and imperfect contact due to oxidation on the other hand. This heat varies with each different composition of irons. It varies because these compositions change the fusing points of irons, and hence their points of excessive oxidation. Hence, while ingredients such as carbon, phosphorus, copper, &c., positively do not prevent welding under fusion or in a non-oxidizing atmosphere, it is probable that they impair it in an oxidizing atmosphere, not directly, but only by changing the susceptibility of the iron to oxidation.

The obvious conclusions are: 1st. That any wrought iron, of whatever ordinary composition, may be welded to itself in an oxidizing atmosphere at a certain temperature, which may differ very largely from that one which is vaguely known as "a welding heat." 2d. That in a non-oxidizing atmosphere heterogeneous irons, however impure, may be soundly welded at indefinitely high temperatures.

* From a paper read by Alex. L. Holley before the Philadelphia meeting of the American Institute of Mining Engineers.

Historical Notes on the Saucepan.

The history of the origin of the common saucepan is pretty well established. Probably the common gourd was the original vessel adapted to and used for heating, cooking and similar purposes, the exterior being kept moistened with water while on the fire. Cocoa-shells have been similarly used. A primitive Sumatran vessel for boiling rice was, and still occasionally is, the bamboo, kept from burning during use, as in the case of the gourd. At length cooking vessels were made of clay and metal, but they were still shaped after the gourd or pipkin, so that our present fashion is not far removed therefrom. Fosbrooke, enumerating the household utensils represented in Egyptian sculptures, remarks: "We met, too, with vessels of the precise form of modern saucepans." The common cast-iron bellied kettle or cauldron furnishes another proof of the forms of culinary vessels having undergone little or no change while passing through so many ages; its shape is precisely the same as that of the *situla*, or pot, sculptured on the obelisk of Heliopolis. The art of tinning culinary vessels, which the Gauls are said to have invented, was most likely from Phœnician sources. The Celtiberi are said to have been expert workers in iron. Their most ancient iron pot had ears and feet, and was shaped like those of the Egyptians. The cast-iron cauldrons of the Chinese are also examples. They are made very thin, and, what is singular, their mechanics have the art of soldering them, when cracked, with portions of the same metal, by means of a blowpipe and small furnace. They are the principal article of furniture in the dwellings of the poor. The boilers of the ancient Mexicans and Peruvians had the general form. As these people had not the use of iron, their vessels were of earthenware, copper and its alloys, and even gold. Large cauldrons were common of old; they are frequently mentioned by Homer, Herodotus, &c., and in the Bible. Some of those represented at Thebes appear sufficiently capacious to contain the cooks that attend them. Crœsus boiled together a tortoise and a lamb in a large brazen cauldron, which had a cover of the same metal.

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And made of the best American Steel, which have been pronounced unequaled in the market by all experts who have been using them for the last fourteen years, and which are now almost exclusively used in all the principal cities of the United States.

For Sale by Iron and Hardware Dealers generally.

AUSABLE HORSE NAILS

POLISHED OR BLUED.

HAMMERED AND FINISHED

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The Ausable Nails

Are Hammered Hot,

And the Finishing and Pointing are Done Cold,

Thus Imitating the Process of Making Nails by Hand.

Quality is **Fully Guaranteed.**

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Budke's Patent Sheet Iron

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Black and galvanized House, Steamboat, Stable and Well BUCKETS.

Powder Kegs, Paint, Putty and White Lead PAILS.

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SUPERIOR SWEDES IRON TACKS

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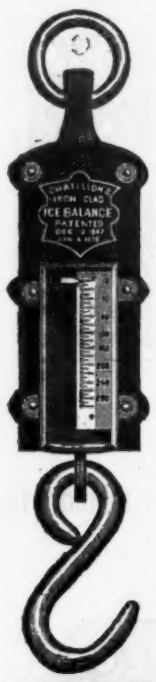

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200, 300, 400 lbs. Capacity.

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FINE TEMPERED STEEL SPRINGS, FINE TEMPERED STEEL BAND SAWS, From ⅛ inch wide upward. Warranted tougher than any other Band Saw. Catalogues on application

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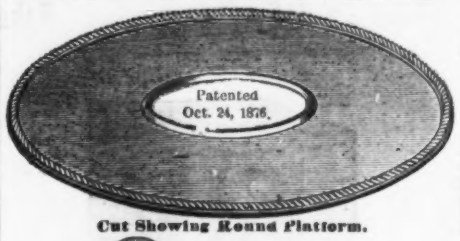
ANSONIA CORRUGATED STOVE PLATFORM



Cut Showing Round Platform.

Section Showing Edge.

Manufactured by the

Ansonia Brass & Copper Co.

Office, 19 & 21 Cliff Street, NEW YORK.

The Ansonia Corrugated Stove Platform, with its heavy figured ogee border, is believed to be the best Platform offered to the trade. As shown in the illustrated section herewith it requires no nailing to keep it in place or to prevent it from turning up at the edge; while the metal is of sufficient thickness to require no lining.

The low price, superior quality and fine finish of this Platform will be readily acknowledged. Packed 24 in a case.

Send for price list.

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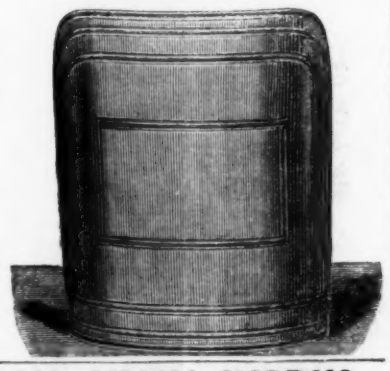
Bronzed Fire Screen,

With Ornamented Mouldings.

PATENT APPLIED FOR.

The Portable Bronzed Fire Screen or Shield, as shown in the illustration, is especially designed for the safety and protection of walls, furniture, woodwork, paper or varnish from heat.

Being constructed of metal, with firm and substantial edges, curved in form to stand alone, it may be easily adjusted to any position about a stove, before a grate or fire place. The demand for something useful, durable and ornamental as a Fire Screen has long been felt, and having finally accomplished the desired result, we are prepared to fill all orders promptly.



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MEDALS AWARDED: Paris Exposition, 1867; Vienna Exposition, 1873; Philadelphia, 1876.

Illustrated Catalogue sent per mail on application.

Failures in England and Wales.

For the following summary of the failures in England and Wales during the eleven years and three months ending March 31st last, we are indebted to Messrs. John Kemp & Co.

The table of comparison of the failures in England and Wales with those of the United States during the last eight years, together with Messrs. Kemp's advice under the present trade depression, cannot, we think, fail to be appreciated.

Year.	1st Quar. Jan. 1 to Mar. 31.	2d Quar. Apr. 1 to June 30.	3d Quar. July 1 to Sept. 30.	4th Quar. Oct. 1 to Dec. 31.	Totals.
1867	3,981	4,081	3,555	4,233	15,850
1868	4,091	4,131	4,139	3,501	15,862
1869	3,819	3,997	4,495	5,207	16,518
1870	2,804	1,589	1,773	1,985	8,151
1871	2,142	2,191	1,837	1,994	8,164
1872	2,192	1,980	1,795	2,145	8,112
1873	2,354	2,299	2,054	2,357	9,064
1874	2,193	2,428	2,339	2,290	9,250
1875	2,331	2,277	2,133	2,453	9,194
1876	2,744	2,573	2,670	2,861	10,848
1877	2,829	2,856	2,610	2,952	11,247
Totals for 11 years	31,480	30,402	28,400	31,978	122,260
1878	3,436	....	....	....	....

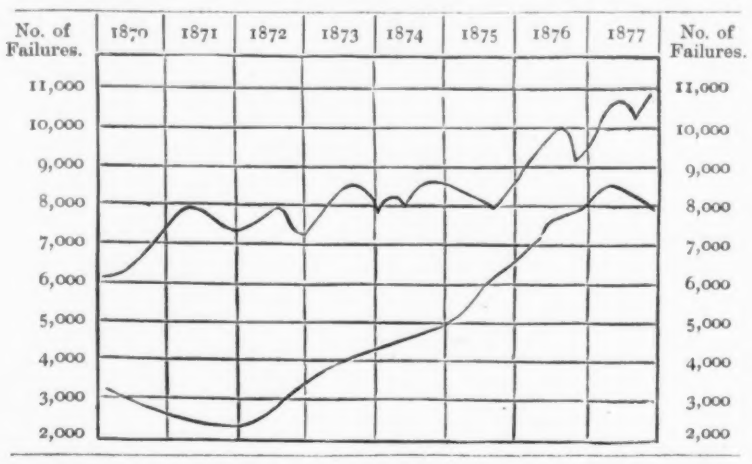
The number of failures published during each of the first three years of this period is much greater than in either of the subsequent years. We attribute these excessive numbers partly to the undue facilities afforded by the Act of 1861 for debtors to escape from their engagements, and partly to the depression of trade which commenced in the year 1866—a large proportion of the number published during the fourth quarter of 1869, and the first quarter of 1870, is attributable to the change in the bankruptcy law, which then took place—it may be estimated that not less than 3000 of these failures were cases in which debtors, with intentions more or less dishonest, hastened the publication of their failure in order that they might not forego the advantage which (up to the 31st December, 1869) they could take of the Act of 1861. The first three quarters of 1869 show fewer failures than the corresponding quarters of the two preceding years, and we accept this fact as evidence of a revival of trade and prosperity in that year, notwithstanding the increased total added during the fourth quarter. The years 1870-1-2, show only moderate numbers of failures; from 1873 to the present time there has been a decided increase, and the number for the first quarter of this year is greater than in any corresponding quarter since the Act of 1869 came into operation.

It is favorable testimony to the Act of 1869 that the failures under it have been fewer than under its predecessor; this testimony may however, be qualified by the more favorable state of trade which prevailed during the first eight years of its operation.

The question occurs: Does the number of failures in a year depend upon natural causes? That is to say, would the number rise and fall periodically according to the state of trade (or national prosperity) if the bankruptcy law remained constant? Whenever failures have become frequent, complaints have been made against the law, and not without reason, but many who complain ignore the existence of any other cause. We compared the foregoing figures with the scientific tables recently published in *Nature*, from the pen of Prof. Balfour Stewart, and being struck with the coincidence in their fluctuations, we further compared them with the statistics published by Messrs. Dun & Co., of New York, of the failures in the United States during the past eight years, which period, being that of the existence of our present bankruptcy law, affords us a fair opportunity for making a comparison. Messrs. Dun & Co. report the following as the total failures in the United States during this period:

1870, number of failures		3,551
1871	"	2,915
1872	"	4,069
1873	"	5,183
1874	"	5,830
1875	"	7,740
1876	"	9,092
1877	"	8,822

The accompanying diagram shows the relation which these figures bear to those for corresponding years for England and Wales. Evidently the same causes which were at work in England to depress trade and overwhelm the struggling and improvident classes were equally effective in other countries; similar complaints of depression come to us from every part of the globe. [The first waved line represents England and Wales, and the second the United States.]



The discussion which has arisen out of Dr. Hunter's suggestion of a "famine period" in India, has brought to the public some knowledge of the existence of natural periods or cycles, of an average duration of 11.9 years each. The suggestion that England is affected with the same regularity is but reasonable, and although fortunately for us as a nation the effects do not produce famine, it appears evident that some degree of suffering is caused, and that the number of failures is thereby materially increased; the commercial panics which have occurred with about the same regularity furnish further evidence that this is the case.

If we make due allowance for the excessive number in the last quarter of 1869, caused by the change in the law, we find that the maximum number of failures in the last cycle occurred in the year 1868, which was the year succeeding the natural minimum; hence we may conclude that about a year is required for the full effect of the natural depression to be reproduced in commerce. The twelve months from 1st October, 1867, to 30th September, 1868, appear to have been more serious to commercial men than either of the complete years, according to the number of failures:

In the 4th quarter of	1867	there were	4,233	failures.
In the 1st "	1868	"	4,091	"
In the 2d "	1868	"	4,131	"
In the 3d "	1868	"	4,139	"
Total			16,594	"

These data indicate that we have not yet reached the worst of the present period; assuming that it runs an average length, we have to endure an increasing number of failures which will not reach its maximum until the fourth quarter of 1879. In the face of such signs as these we can only counsel strict economy in every item of expenditure—extreme prudence in embarking in any new venture or in any extension of business—the utmost care in the management of credit accounts, and a patient determination to work and wait for more prosperous times.

In previous periods of depression, the evils attendant upon them and which are inevitable have been seriously augmented by the public mind becoming so alarmed as to be panic-stricken; we trust the present may prove an exception, and that as more light is thrown upon the natural causes and effects which govern such depressions, the public mind will be more composed and willing to wait contentedly for the recurring period of prosperity.—*Ryland's Iron Trade Circular.*

On The Manufacture of Coke from Anthracite Dust.

BY JONES WISTER

At the suggestion of a member of the Geological Survey of Pennsylvania, the writer made a number of experiments in using anthracite coal as a basis for coke. The additions of bitumen, gas tar (gas works waste) or bituminous coal were all used in the mixtures with a view to supplying the necessary cementing qualities lacking in anthracite. An ordinary blacksmith's fire supplied the heat required, black lead crucibles of about one pound capacity being used to receive the mixtures. The results arrived at proved several points:

1. That any mixture varying from 50 per cent. anthracite dust and 50 per cent. bituminous dust to 75 per cent. anthracite dust, 10 per cent. gas tar or bitumen—for they are interchangeable—and 15 per cent. bituminous dust, will make a beautiful steely, lustrous, heavy coke.

2. That a heat higher than can be obtained in a coking oven is an absolute necessity to produce a good anthracite coke.

3. That in order to obtain a commercial success in producing anthracite coke, the utilization of the gas contained in the bitumen and bituminous coal must be a part of the process, at the present price of anthracite coal.

It may be interesting to state that through the kindness of the Harrisburg Gas Company the writer was enabled to make an experiment on a larger scale: 260 lbs. or 52 per cent. anthracite dust, 150 lbs. or 30 per cent. bituminous coal dust, and 90 lbs. or 18 per cent. gas tar were taken, making a charge of 500 lbs., which was placed, after thorough mixture, in three ordinary cast-iron retorts. For four hours these retorts were subjected to the bright red heat employed in making illuminating gas in iron retorts. The coke resulting was perfect, though not hard enough for blast furnace use. It was tried in a blacksmith's fire and produced a very high heat, quite equal to that of the best soft coal fire, with the advantage of making a fire free from smoke. Were it possible to make anthracite coke on a large scale equal to what can be produced in a small way, there is no doubt that the vast hills of anthracite dust now cumbering the earth near the breakers would be utilized. The following mixture will make a solid, lustrous coke, provided the anthracite coal dust is finely pulverized and the bituminous coal and gas tar are thoroughly mixed before charging, and are subjected to a white heat for about 1½ hours: 65 per cent. anthracite dust, 25 per cent. bituminous coal dust, 10 per cent. gas tar. The attendant loss of weight amounts to from 22 to 25 per cent. A good coking bituminous coal was subjected to a similar treatment as the above mixture, and the result was an inferior coke, notwithstanding the fact that some coal coked well in a blacksmith's fire.—*The Metallurgical Review.*

A cordial invitation to the American mining engineers who go to Europe during the present summer to visit the industrial districts of Germany has been extended by the Society of German Engineers, and the Prussian Minister of Commerce, Industry and Public Works. The Society of Civil Engineers of France also proffers, in graceful terms, Parisian hospitalities.

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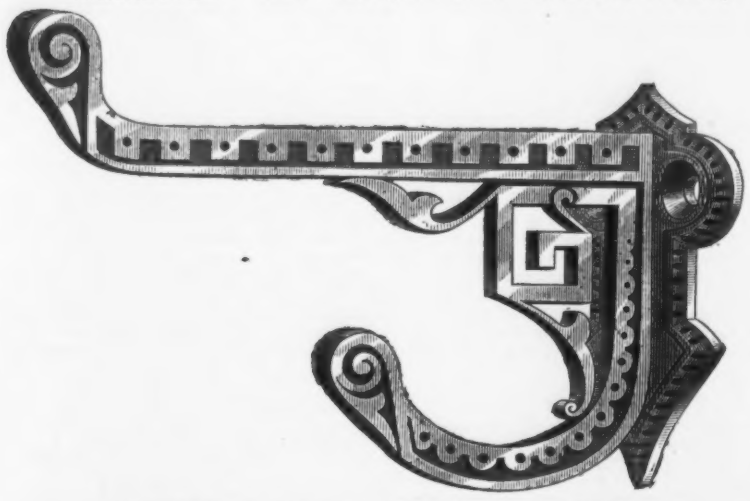
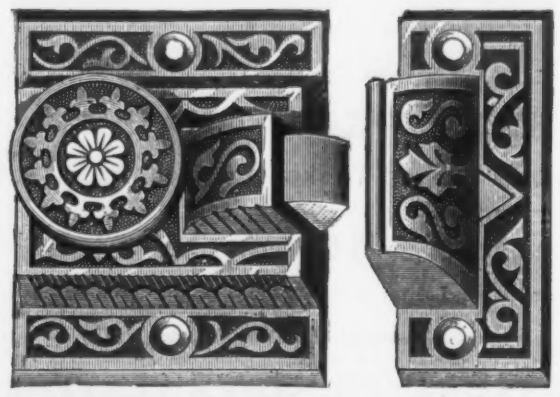
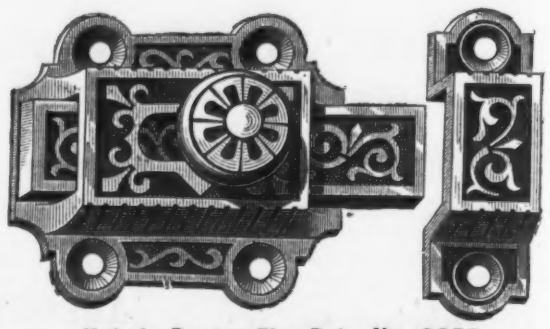
WAREHOUSES: NEW YORK, 45 & 47 Chambers Street; PHILADELPHIA, 425 Market Street; BALTIMORE, MD., WM. H. COLE. Agent, 17 South Charles Street.



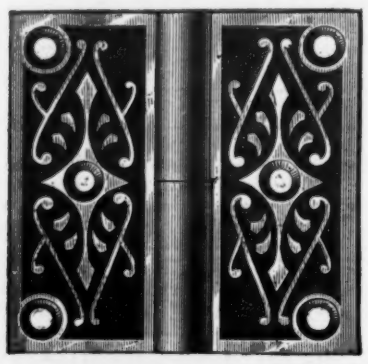
Kahala Bronze Coat and Hat Hook, No. 8000.



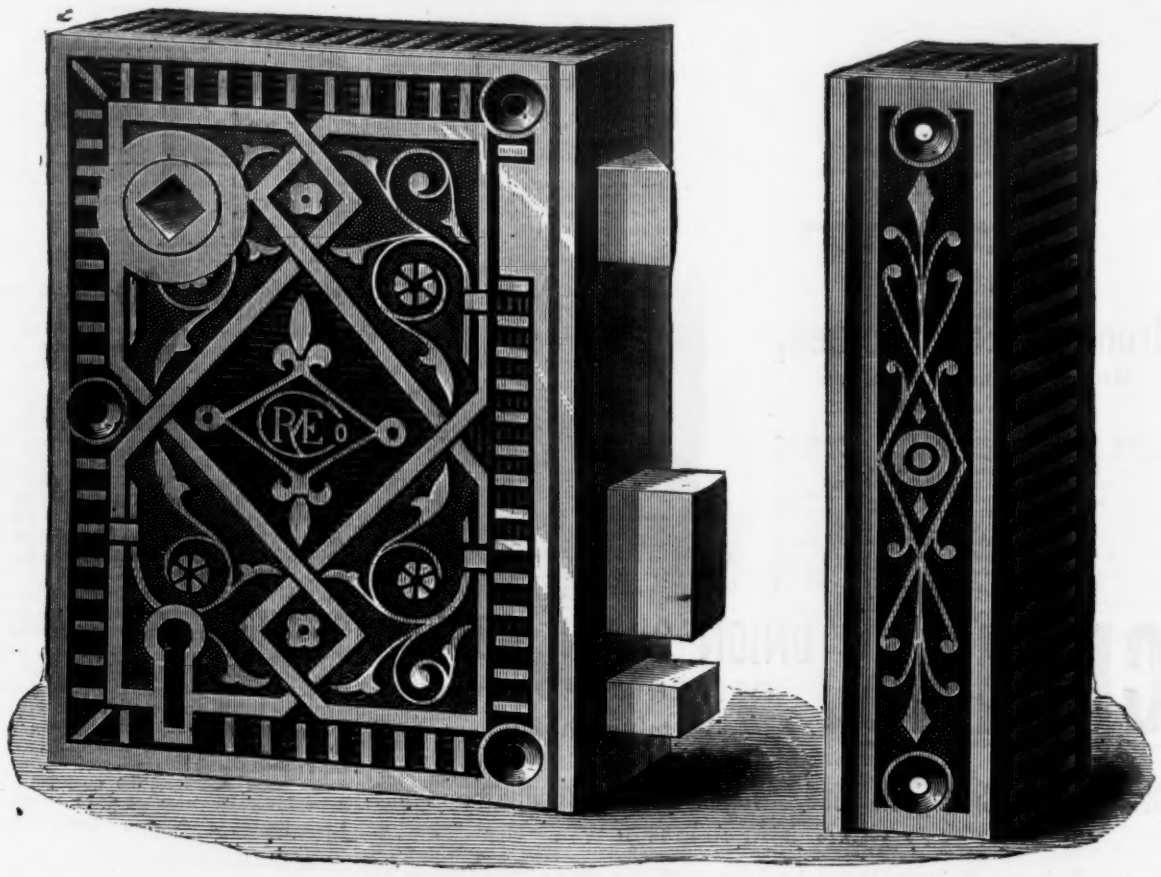
Kahala Bronze Cupboard Turn, No. 415.

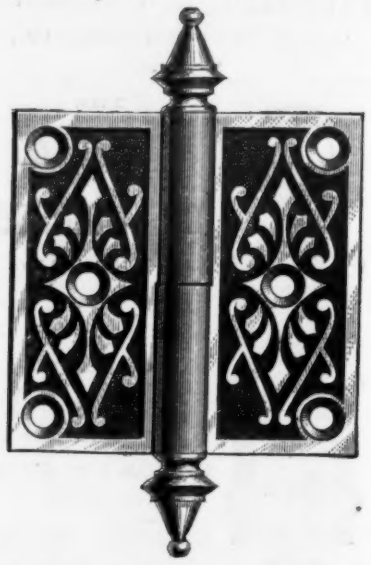


Kahala Bronze Flat Bolt, No. 8050.

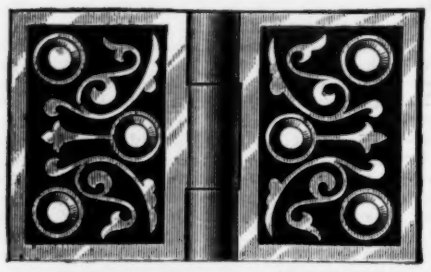


Kahala Butts, No. 8009, 2x2.

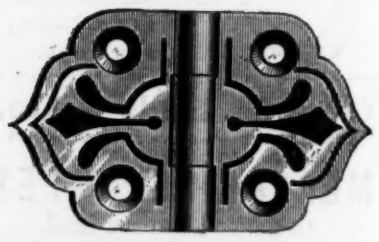




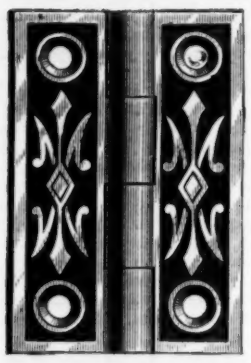
Kahala Loose Joint Butts Acorn Tip.



Kahala Back Flap, No. 8006, 1½x2¼.

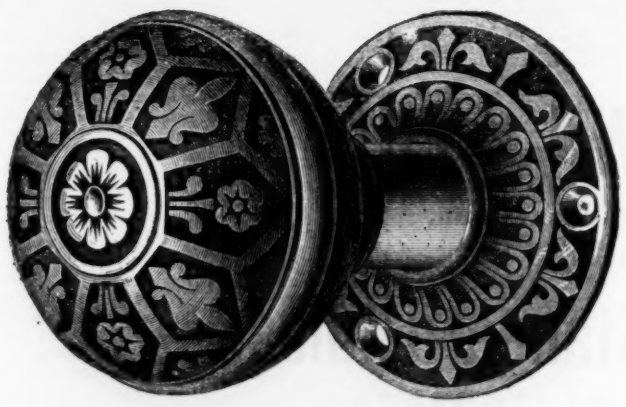


Kahala Back Flap, No. 8005, 1¼x2.

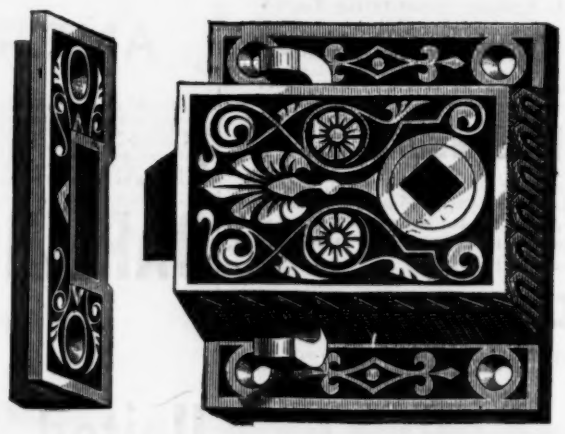


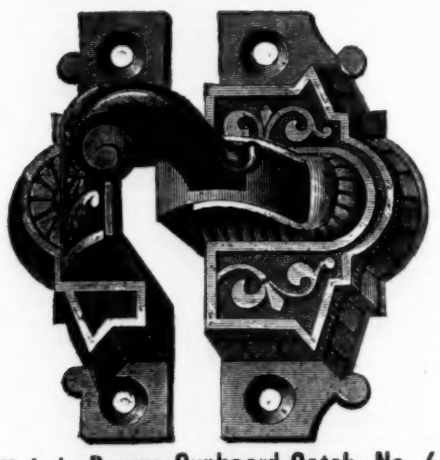
Kahala Butts, No. 8007, 2x1¼.

Kahala Bronze Lock, No. 8866.



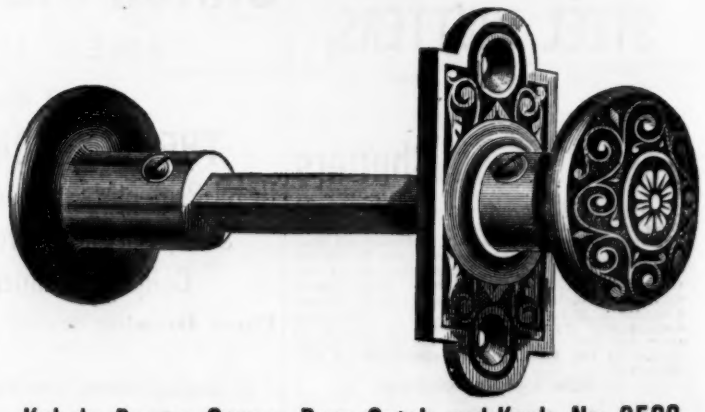
Kahala Bronze Door Knob, No. 8000.





Kahala Bronze Cupboard Catch, No. 410.

Kahala Bronze Burglar Proof Sash Fast, No. 26.



Kahala Bronze Screen Door Catch and Knob, No. 8500.

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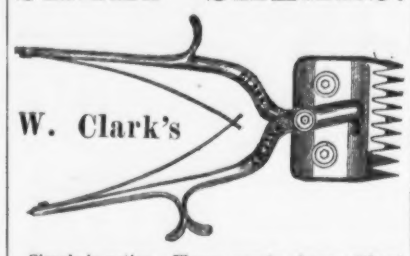

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The assortment of Gardner's Celebrated Barlow Knives has been increased, and they are now furnished with Rubber, Bone, Stag and Wrought Iron Handles.

All of Gardner's Patent Knives are fully warranted.

ESTABLISHED 1853.

AARON BURKINSHAW,

Manufacturer of **Pen and Pocket Cutlery,** Pepperell, Mass.

My Blades are forged by hand from the best Cast Steel, and warranted. To me was awarded the Gold Medal of the Conn. State Agricultural Society.

HAGSTOZ & THORPE.

Sole Manufacturers and Proprietors.

Sixth and Chestnut Sts., Philadelphia, Pa.

HALL, ELTON & CO.,

Electro Plated Ware, German Silver and Britannia Spoons.

THE "ORLEANS."

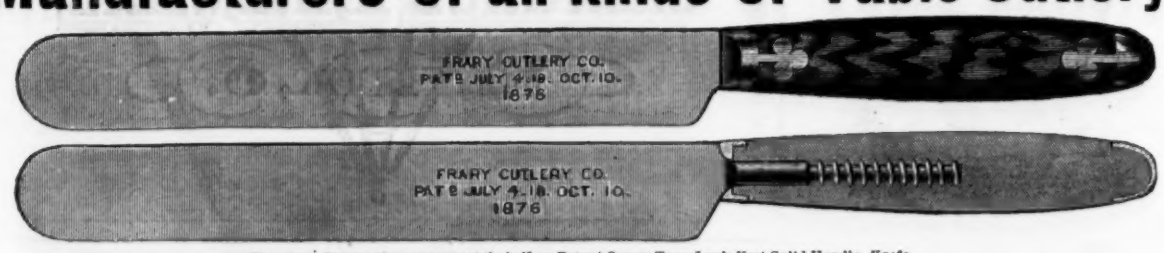
Factories, Wallingford, Conn. Salesroom, 75 Chambers Street, New York.

THE FRARY CUTLERY COMPANY,

FACTORY, BRIDGEPORT, CONN.

NEW YORK OFFICE & WAREHOUSE, with WIEBUSCH & HILGER HARDWARE CO., 84 Chambers St.

Manufacturers of all kinds of Table Cutlery.



The above Illustrations represent their New Patent Screw Tang Lock Fast Solid Handle Knife.

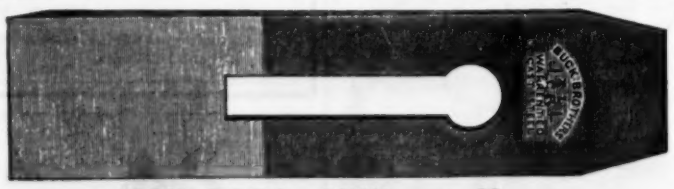
There is no question but that a solid handle Knife is much more preferable than a scale tang. The great objection to their use hitherto is, that no solid wood handle has been placed on the market with the handle properly secured—no handle put on with cement will stand the wear and tear of every day usage. The cement will expand and contract with the action of heat and cold, and become loose, crack and come off, causing great prejudice against their use. This objection is overcome in our patent screw tang. A wood screw is welded to the tang of the Knife or Fork, and screwed firmly and securely in the handle and locked there by the bolster, making a very strong neat and handsome knife, which we warrant never to get loose, crack or come off. We manufacture a large variety of patterns, both Table, Butchers and Carvers, and furnish the patent handle nearly as low as the scale tang. We are prepared to furnish this line of goods, together with the scale tang and iron handle, very promptly, and very respectfully invite the attention of the trade.

CLOTHES WRINGER!

Self-Adjusting Steel Elliptic Spring.

T. J. ALEXANDER, Manager,

BOSTON, MASS.



BUCK BROS, Millbury, Mass.

The most complete assortment in the U. S. of **Shank, Socket Firmer and Socket Framing Chisels,**

PLANE IRONS.

Gouges of all lengths and circles, beveled inside or outside. Nail sets, Scratch and Belt Awls, Chisel Handles of all kinds. Orders filled promptly; generally same day as received.

CORPORATE MARK,

Joseph Rodgers & Sons'

(LIMITED)

CELEBRATED CUTLERY,

No. 82 Chambers Street, New York.

F. & W. CLATWORTHY, Agents.

The demand for **Joseph Rodgers & Sons'** productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power.

To distinguish Articles of **Joseph Rodgers & Sons'** Manufacture, please to see that they bear their Corporate Mark.

ESTABLISHED 1854.

NEW YORK KNIFE CO.

MANUFACTURERS OF SUPERIOR

Table & Pocket Cutlery,

WARRANTED TO BE MADE OF THE BEST MATERIAL.

WALKILL RIVER WORKS,

Walden, Orange Co., New York.

THOS. J. BRADLEY, President.

ALFRED H. HILDICK,

12 Warren St., N. Y., importer of

Birmingham Heavy Hardware, Chains, Anvils, Vises, &c.

Agency of HILL BROS. & CO., WALSALL, ENGLAND

GENERAL HARDWARE MERCHANTS,

And of

Ball's Pat. Solid Steel Sheep Shears.

These Shears are unsurpassed for cheapness, durability and utility. They are made of one solid piece of steel from point to point, and cannot be broken in use, either in the bow or at the junction of shank and blade. Samples can be seen at above address, or sample lots furnished. Depot for "THE CROWN" SOLID BOX VISES. A cheap and excellent Vise.

L. SOLOMON,

Commission Merchant

IN

House Furnishing Goods.

Agent for the

Champion & Knox No. 99 Fluting Machines,

EUREKA & PEERLESS WRINGERS.

100 Chambers St., New York.

Steam Boilers for Very High Pressures.

In the discussion following a paper on this subject, read before the Institution of Naval Architects, Mr. McFarlane Gray compared the relative economy of present and former engines, showing that in former practice the boiler pressure was 25 lbs., or 40 lbs. absolute pressure, per square inch, yielding 6 horse-power for a certain quantity of coal; but that now, with 65 lbs. boiler pressure, or 80 lbs. absolute pressure, for the same quantity of coal, the result was 8 horse-power; that was to say, the pressure had been multiplied by 2, and 2 added to the 6 horse-power. And from this comparison, and from calculation, Mr. Gray inferred that "the horse-power increased in arithmetical progression, and the pressure in geometrical progression" and that "it would require 120 lbs. on the square inch to double the present efficiency, even if that pressure could be carried without additional drawback." There could be no doubt that boilers of the existing types, especially marine boilers, would not carry much higher pressures than they were now subjected to, even though the usual factor of safety might with propriety be reduced; the limited space allowable on board ship for boiler room, and the necessity of occupying that space in the most economical manner, left scarcely any choice as to the external size of each separate boiler, and the size being thus dictated, the pressure to be carried was necessarily limited by the possible thickness of the iron of the outer shell and the means of riveting it. By an extension of the heating surface in relation to the grate surface, so that the temperature of the escaping gases might be reduced to a minimum, the evaporative economy of all boilers might be made nearly the same; but a boiler having favorable disposition of the surfaces would more readily be adapted to such reduction of the temperature of the escaping gases, and the maximum efficiency could accordingly be obtained in such a boiler with the least extension of the heating surface, and therefore with the least size and weight. On this ground it was believed that important economy might be obtained by the use of water tubes.

In connection with the question of weight, which had such an important bearing upon the policy of fitting tubulous boilers for marine purposes, there were one or two points demanding consideration. When comparing the total weight of machinery of different types, it was only fair to include the weight of coal necessary for a given number of days' consumption in each case, and, regarded in this light, the tubulous boiler, by reason of its greater economy, would have some advantage. Again, if economy of weight in connection with high pressure was desired, the grate surface might be so much enlarged, in proportion to the heating surface, that abundant steam generation with small weight might be obtained, but at the cost of increased consumption. Of course this was so for all types of boilers; and it was a question of experience how to proportion the grate and heating surfaces to each other that the escaping gases might be of the most suitable temperature. In the best marine practice, boilers of the cylindrical type were now made with about three square feet of heating surface and 0.12 square foot of grate surface per indicated horse-power, that was as 25 to 1. In some examples of tubulous boilers the proportions were approximately as follows:

Name.	Indicated horse-power.	Grate surface.	Heating surface.	Grate surface ÷ indicated horse power.	Heating surface per indicated horse-power.	Propor'n of heating surface to grate surface.
		sq. ft.	sq. ft.	sq. ft.	sq. ft.	
Red Rose.....	600	72	1,587	0.120	2.64	22 : 1
L'Actif, Belleville	400	75	2,347	0.188	5.86	31 : 1
Propontis.....	1,100	143	8,700	0.130	7.9	61 : 1
Montana.....	4,500	540	21,710	0.12	4.82	40 : 1
Watt's Patent	....	...	....	0.12	3.0	25 : 1
Perkins' " ..	150	19	760	0.126	5.0	40 : 1

The Sheffield Steel Trade.

The leading manufacturers in the steel trade—especially those whose business has been chiefly with the Continental and American markets—still complain of the scarcity of orders; and that their complaints are well founded is shown by the number of their furnaces that remain unlighted and the short hours worked by their men. There are houses whose steels are taken exclusively in certain markets, and special houses who are doing a good business, and who, throughout, have suffered but little comparatively by general depression. The large places, such as William Jessop & Sons, Thomas Frith & Sons, Sandersons, and others, are only experiencing a very quiet demand for steel for manufacturing purposes. The fact is that of late years many of the leading manufacturers in the file and edge-tool trades have made their own steels, and have even embarked in the trade themselves; and this has very much crippled the demand from the steel manufacturers proper. Prices are still represented as being very low, and no good purpose would be served by quoting them. There are standard quotations, but every house feels itself at liberty to allow its own discounts upon them, and even, we understand, to vary its own discounts as exigencies may arise. Some houses in the Bessemer steel trade are doing a moderate business, and their furnaces are in full work. This branch, however, is seriously affected by the depression in the rail trade. Messrs. Bolckow, Vaughan & Co., and some other firms in the North are making rails by what is termed the "direct process," by which, when once the metal is made hot, it is carried through all its processes—without reheating—until it is thrown out a completed rail; thereby a great saving is effected, and the makers are able to offer them at prices such as Sheffield houses cannot touch. There is, however, to be settled the question of the durability of these rails, and whether they are capable of bearing the wear and tear and strain of a rail made on the old principle. They are being tested on some of our leading lines of railway, and the result is being anxiously watched. If the "direct process" turn out a success, it will very seriously affect alike the Bessemer and the rail trade of Sheffield. —*Ironmonger.*

S. H. & E. Y. MOORE,

68 Lake Street, CHICAGO, ILL.,

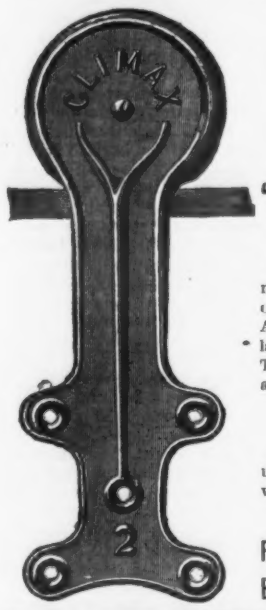
Heavy Hardware & Railway Supplies.

AGENTS FOR

Providence Tool Co., Reading Bolt & Nut Works, Syracuse Bolt Co.,

And Other Manufacturers.

MANUFACTURERS OF



CLITAX BARN DOOR HANGERS,

MOORE'S

Anti-Friction Sliding Door Sheaves,

"Folant" Barn Door Catches,

&c., &c.

The **"Climax"** is recognized as the **Leading Hanger** in the market. It is **altogether superior** to any other Barn Door Hanger ever made. In the "Climax" is a **complete wheel** provided with Anti-Friction Bearings. It is practical, hence its widespread popularity. It is the **only** Anti-Friction **Hanger having a Wheel.** The trade are cautioned against imitations, made to sell, and which are without any mechanical principles to recommend them.

Moore's Anti-Friction Hay Fork Pulley.

The main wheel contains four anti-friction wheels which revolve upon axles fast in its sides. The main wheel revolves nine times while the anti-friction wheels are revolving once.

Depot for goods of our manufacture:

FERNALD & SISE, 100 Chambers Street, New York.
E. & C. GURNEY & CO., Hamilton, Canada.

PARAGON FLY TRAP.

The Quickest Selling Trap in the Market.

Larger than other Cone Traps.

PRICE, per single dozen, $3·00.

Special Prices in Quantity Lots.

Prices the Lowest in the Market.

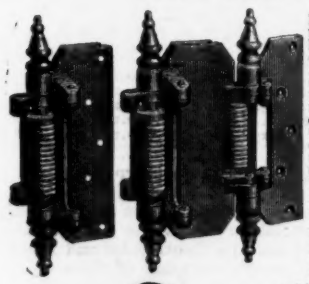
TENNIS & WILSON,

81 Beekman Street, New York.

The Cowles Hardware Co., Unionville, Conn.,

MANUFACTURERS OF

Geer's Double and Single Action Spring Butts.



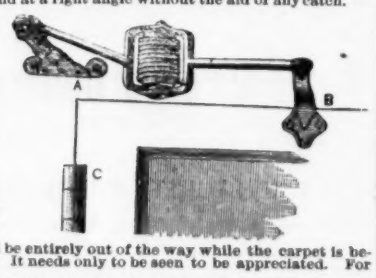
Reverse in action and radically different from any other in market. Patented July 17, 1877. The accompanying cut shows our Double Action Spring Butts for swinging doors both ways. We claim the following points of superiority: *First.*—These Butts differ from all others in principle and action, combining the *Toggle Arm with the Spiral Spring*, which by actual test gives out from 60 to 80 per cent. *more force* at the *closing point* than when opened to a right angle, thus holding the door firmly in place, and not allowing it to be moved by currents of air. *Second.*—*They will allow the door to be opened clear back to the wall*, and the spring retains it there; thus the toggle and spring fill two important offices—that of holding the door closed and also open. *Third.*—It is impossible to strain the spring, as there is not more than 60 per cent. of the elasticity of it used in swinging the door back to the wall, therefore it will not become weak from constant use. *Fourth.*—The bearings are all faced with hardened steel, which is much superior to common cast iron or brass, both in regard to friction and durability. *Fifth.*—They will hold the door firmly up to its place on the top, and not allow it to open off, thus obviating all tendency to sag. *Sixth.*—These Butts are so constructed that there is no right or left hand. When adjusted to the door they *never need taking up or letting out*, as they are perfectly adapted for either summer or winter, without any change whatever.

HERCULES

Reverse Action Door Spring and Retainer.

(Patented March 4, 1873.)

On an entirely new principle, distinct from all others. Holds the door open as well as shut, and allows the door to stand at a right angle without the aid of any catch.



BULLARD'S PAT. CARPET STRETCHER.

Patented June 13th, 1876.

The best thing ever made for laying carpets. It is light, simple in construction, durable and not expensive, is very easy to operate, and is warranted not to injure the finest carpet. It holds the carpet in position after it is drawn to its proper place, thus giving the operator the free use of both hands with which to do the nailing. The lever, E, is then folded back and down upon the push bar, A, so it will be entirely out of the way while the carpet is being nailed. No person using one once will be without one. It needs only to be seen to be appreciated. For utility it defies competition.

Also manufacturers of Awls, Bung Starts, Butter Spuds, Bill Hooks, Brush Hooks, Butts (Double Spring and Single Spring), Border Knives, Box Openers, Box Hooks, Box Scrapers, Cleavers (Cast Steel), Cake Turners, Corn Hooks, Cover Lifters, Cold Chisels, Carriage Jacks, Carpet Stretchers (Bullard's and Common), Door Springs (Hercules and Air Cushion), Fish Turners, Ferrules (Brass), Handles, Hammers (Magnetic Tack, Steak, Steel Tack and Iron Tack), Hoes (Shuffle), Ice Axes (Iron), Ice Awls (Lignumvitæ, Iron Heads and Maple H'dle), Ice Tongs, Mouse Traps (Pat. Automatic), Mincers (Cast Steel and Hammered), Nail Sets, Nut Cracks, Punches Round), Screw Drivers (Sewing Machine, Lock Sp'ns, Bit Brace and Implement), Spoons (Tea and Table), Trowels (Garden), Tack Claws, Vegetable Slicers, Washers (Tin and Iron). Send for price lists and discounts.

New York Office & Warerooms, 87 Chambers & 69 Reade Sts., with Coulter, Flagler & Co.

THE ÆTNA SPRING AND AXLE CO.,

John St., Bridgeport Conn., Manufacturers of

THE VERY BEST SPRINGS AND AXLES.

Our Standard Springs, weighing about half as much as the Springs of other makers, to do the same work cost but little more per vehicle than a common Spring. Our Jamb-screw, Collinge Collar, Parallel Arm, Malleable Iron Box Axles are the best in the world. Exclusive makers of

LEWIS'S TORSION AND CROSS SPRINGS.

Supercedes the Brewster Cross and End, dispenses with side spars, weigh less, hangbody equally low, ride easier and cost less. **Shop newly stocked with new and improved Machinery.** Send for Price Lists

W. H. WILSON Prest. and Treas O. P. LEWIS (formerly of Spring Perch Co.), Sec. and Supt.

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MACHINE SCREWS,

One-sixteenth to five-eighths diameter.
Heads and points to sample.
IRON, STEEL and BRASS.

Lyon & Fellows Mfg. Co.,

Cor. 1st and North 3d Streets, Williamsburgh, N. Y.

FRANKLIN S. MILES,

Manufacturer of

Brass, Iron, Steel and German Silver SCREWS.

205 Quarry Street, Philadelphia.

R. COOK & SONS,

Manufacturers of

Carriage & Wagon AXLES,

WINSTED, CONN.

ESTABLISHED 1839.

THE

BUCKEYE LAWN MOWER

The lightest running, most durable and best Lawn Mower in the market.

Send for descriptive circular and price list to

MAST, FOOS & CO.,

Manufacturers, **Springfield, Ohio.**

IMPROVED

EXTENSION RACKS.

A. A. WEEKS,

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MANUFACTURER OF

Hat and Clothes Racks, Towel Racks.

TUCKER & DORSEY,

MANUFACTURERS.

We make Till either for Coin or Scrip.

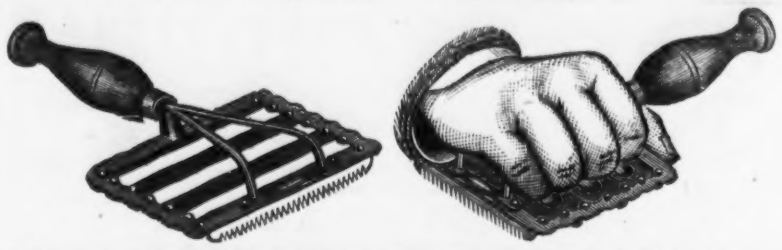
Our Lock has no Rival

PITTSBURGH MFG. CO.,

Manufacturers of Nail and Spike Machines, Bolts Nuts, Washers, Rivets, &c. Castings, Forgings and Blacksmith Work promptly attended to.

OFFICE & WORKS, Railroad St., near 28th, Pittsburgh, Pa

HOTCHKISS' PATENT "SUPERIOR" COMB.



We invite the special attention of the trade to our Patent "Superior" Curry Comb, which is the *best* and *most complete* side handle Comb having a grasp over the back now in existence, and which for *neatness, strength* and *durability* has no *equal*. Give them a trial and you will be convinced that they are *Superior* to *any* Curry Comb in the market. They are neatly put up in paper boxes of one dozen each and packed 15 dozen in a case. For sale by the jobbing Hardware, Saddlery and Woodenware trade.

HOTCHKISS' SONS, Bridgeport, Conn.

Philadelphia "STAR" Bolt Works.

NORWAY IRON FANCY HEAD BOLTS,

Carriage & Tire Bolts. **Star Axle Clips, &c.**

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MANUFACTURE

Machine & Car Bolts,

COLD PUNCHED

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Nuts, Washers,

Tank and Coopers'

RIVETS,

Bridge Rods and Bolts

WOOD SCREWS,

Chain Links.

"Keystone" Boiler Rivets.

Unequaled in Quality and Finish.

BLACK AND TINNED IRON RIVETS.

HENRY B. NEWHALL 11 WARREN ST. N NEW YORK AGENT

W. P. TOWNSEND & CO.,

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Manufacturers of every description of First Quality,

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Tubular Bow Sockets.

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FORT PLAIN SPRING AND AXLE WORKS.

FOR SPRING TRADE.

All dealers in **SPRINGS AND AXLES** will find it to their interest to send to us for Price List and Discounts. **WOOD, SMITH & CO., Fort Plain, N. Y.**

DOG MUZZLES.

The Patent Automatic, with Spring Jaw.

COMMON WIRE MUZZLES,

New Pattern, in nine different sizes. Also full and varied line of Metal and Leather

DOG COLLARS.

Stair Rods in Brass, Fire Gilt and Nickel-Plated.
Tacks, Escutcheon Pins, Hair Wire, Picture Wire, &c.
Special Brass Goods made to order.

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H. D. SMITH & CO.,

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Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

ENTERPRISE Mfg. CO. of PA.

Patented Hardware Manufacturers and Iron Founders,

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SPECIALTIES.
Enterprise Patent Cold Handle Double Pointed
SMOOTHING AND POLISHING IRONS,
CHAMPION TOBACCO CUTTERS,
PATENT MEASURING FAUCETS,
SELF-WEIGHING CHEESE KNIVES,
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FRUIT, LARD and JELLY PRESSES,
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Coffee Roasters, Bung-Hole Borers,
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PITTSBURGH, PA.,

MANUFACTURERS OF

Heavy and Wagon Hardware,

BOLTS AND NUTS

OF ALL KINDS,

HENRY B. NEWHALL 11 WARREN ST. N NEW YORK AGENT

Screw Hook and Strap and T Hinges,

Etc. Etc.

Send for lithographs and price lists.

BUY THE **Covert Neck Yoke** AND NECK YOKE LEATHERS

Our Yokes are all warranted the **best second-growth hickory** and vary in finish from common to the finest Yokes in use, and our Adjustable Neck Yoke Leather combines neatness, strength and durability. They cost less and are far superior to any other way of leathering yokes. Sample Leather sent by mail on receipt of 60 cents.

For full particulars send for Circular and Price List.

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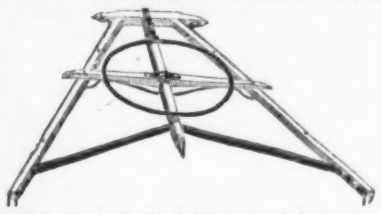
Rivets, Hand Iron Cutters, Punches, Shears, and Planing and Shaping Machines; Universal Ratchet Drills, and Patent Tinners' Snips.

New York Warehouse, 116 Chambers Street.

EUREKA
PLATFORM SPRING WAGON GEAR.



Patented in the United States and Canada.

The attention of Manufacturers and of the Carriage Hardware Trade is respectfully invited to the Eureka Platform Spring Wagon Trestle.

This Gearing is far ahead of all others in strength and light appearance. It is the strongest and most perfect gear in use, and is meeting with a large sale. Manufacturers of Platform Wagons will use no other after a trial of this.

PRICE.

$7.00 for Trestle warranted to carry 1000 lbs.
7.50 " " " " 1500 "
8.50 " " " " 2000 "

Terms cash. Liberal discount to the trade.

For circulars and full information address

ROME TRESTLE COMPANY, Limited,
ROME, N. Y.

Torrey's Door Springs
AND
Ice Cream Freezers.

P. R. DUNNE, Manufacturer,
No. 182 Fulton Street, New York.
Send for prices.

NEW MONITOR ICE BALANCES.

Patent granted ——, 1878.

No. 55, to weigh 150 lbs. by 2 lbs.....per doz., $60.00
No. 56, " 300 " 5 " ..... " 80.00
No. 56½, " 400 " 5 " ..... " 100.00

Made of lap-welded tubes; no pointers; accurate, strong and durable.
Warranted.
☞ Trade discount on application.

Manufactured by
CHAS. FORSCHNER, 41 Rivington St., N. Y.

E. S. DODGE PRINTING CO.

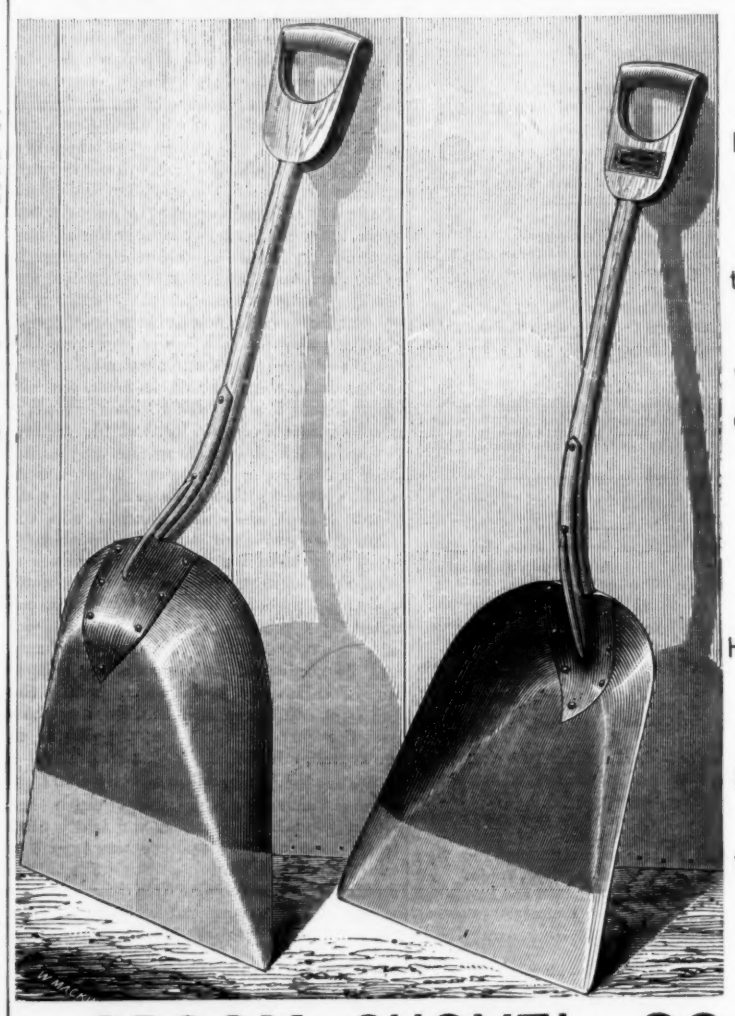
WE FILL ORDERS AT LOWEST RATES CONSISTENT WITH GOOD WORK. ESTIMATES MADE WHEN DESIRED.

95 CHAMBERS ST.=READE ST. 77.
NEW YORK.

E. HUTCHINGS, Sup't.

BUSINESS!!

The Grain Scoop with the PATENT CORRUGATED STRAP HANDLE is the Scoop of the Period.



It costs but ten Cents more than the Scoop with the common Strap.

Every Live Hardware Dealer has it, because it is the best thing made.

GROOM SHOVEL CO.,

Manufacturers, SAINT LOUIS, MO.

Patented Jan. 4 and June 13, 1876.

THE PERFECT Sash Lock.

Made only by

PAYSON & CO.

Manufacturers of

Small Hardware, in Plain and Ornamental Iron, Brass, Nickel and Bronze.

1319 to 1325 West Jackson St., CHICAGO, ILL.

Daman

STANDARD HOLLOW AUGERS.

C. C. HARLOW & CO.,

BRIDGEWATER, MASS.,

Manufacturers of DAMAN STANDARD HOLLOW AUGERS.—Universally acknowledged superior to any other in the market. They have recently been improved, making them, as now offered to the trade, the most perfect tools of their kind, either in design, material or workmanship. SPOKE AND DOWEL TRIMMERS.—The very best as well as the cheapest. METALLIC COMBINATION PLOW PLANE.—Made of solid cast steel and of gun metal. Of an entirely new design. Can be used as Groover, Dado and Rabbet Plane, in any direction of the grain, and also as a Match Plane. COMMON SENSE DOOR SPRING.—The most durable and cheapest Door Spring yet made. LEAD PIPE CUTTERS.—To cut lead pipe in any position and without chips or burs. Please send for circulars and prices.

The Iron Age.

New York, Thursday, May 30, 1878.

DAVID WILLIAMS - - - *Publisher and Proprietor.*
JAMES C. BAYLES - - - - *Editor.*
JOHN S. KING - - - - *Business Manager.*

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Messrs. John Kemp & Co.'s statistics of failures in England and Wales, compared with those in the United States, suggest some interesting reflections. We give their report in full, and while the statistics of American failures are not quite accurate, they are sufficiently correct for purposes of comparison. Messrs. Kemp & Co. do not think that in England and Wales the worst of the commercial crisis has been experienced; in this country there is reason to believe that the worst is past, and that most of those who now survive the long depression are likely to tide over the interval which precedes recovery.

Telegram and Paragraph Government.

It is much to be regretted that so large a share of the power of government has fallen into the hands of the class of gentlemen who figure as resident Washington correspondents of the newspaper press. While responsible only as private citizens and acting simply as agents for the proprietors of the publications employing them, these gentlemen wield a power for good or evil which no one can estimate. Ostensibly, they are simply news gatherers. Presumably they are instructed to use due diligence to obtain early and correct information, and to forward by telegraph or mail such facts as they gather. That they exercise any editorial functions or have any voice in controlling the policy of the journals for which they correspond, is not assumed by them nor conceded by their employers. In point of fact, however, they do control the policy of the journals they write for to an extent far greater than is commonly supposed. Journalistic enterprise demands that they should furnish the earliest and fullest information on everything transpiring at the seat of government. The first and, generally speaking, the only qualification demanded for this service is an ability to generalize plausibly from imperfect data, to make a mountain of statement out of a molehill of supposition, and to supply any deficiency of fact with sensational rumors and partisan falsehoods. We have no doubt that many of these gentlemen are well-meaning, hard-working journalists, who would gladly discharge their responsible duties with intelligence and fidelity to truth; but their position is one of great difficulty and temptation. To delay sending a news item for twenty-four hours in order to verify by inquiry or investigation, would be regarded as showing a lack of enterprise. They must catch at every report which gains currency, consider it superficially, construe it so as to serve the interests of the party with which their journals are identified and dispatch it at once. In the office at which it is received it is the latest and perhaps the only information received respecting the events of the day at Washington. It may contain gross, though perhaps unintentional misstatements; it may be unjust and unfair in every particular, and may even slander and blacken some Representative, Senator or public officer whose honorable character and public services should insure him immunity from ill-advised attack and personal abuse. It is, however, the news of the hour, and the editor makes it a text for a leader or a paragraph which may do incalculable injury. A slander always travels so fast and so far that truth never completely overtakes it. And so between the telegraph and the paragraph public opinion is formed and the country is governed. No one appreciates more fully than we do the importance of newspaper enterprise. No one can more strongly deprecate the evils which are entailed by a reckless haste to gather news and an over-readiness to accept the hasty and ill-considered utterances of newspaper correspondents as facts which justify the editor in attacking and condemning whatever the correspondent may present in an unfavorable light.

We are led to these remarks by a circumstance which has come under our notice during the past few weeks, and which illustrates in a striking manner the extent to which a public man may suffer from the reckless abuse of power by a correspondent at one end of a wire and an editor at the other. On the 7th of May a motion was made in the House of Representatives to go into Committee of the Whole to consider the Tariff bill. Among those who voted aye was Hon. Wm. D. Kelley of Pennsylvania. Immediately a score of correspondents—among them those of the Philadelphia press—rushed to the telegraph office with the startling announcement that Judge Kelley had abandoned the protectionists and voted with the free traders. Upon receipt of this startling information, which should have carried its own contradiction with it, the editors of the Pennsylvania newspapers fell to writing editorials and paragraphs. Judge Kelley's political enemies exulted in his supposed treason, and his friends shook their heads and lamented that one so long and honorably identified with the cause of protection should have fallen from his high estate and betrayed his principles. The correspondents stated, the editors affirmed and the people believed that the explanation of this abandonment of principle was found in an inordinate personal vanity which made Judge Kelley more willing to vote with the free traders than to forego the privilege of making a speech, and not only his own district, but the whole State, rang with abuse of this gifted and conscientious gentleman, whose record as a friend of American industry is one of brilliant and untiring effort in the cause of protection.

Now, what are the facts of the case? The bill had been referred on the 25th of March to the Committee of the Whole, and this action was irrevocable. It must either be considered and disposed of or postponed from day to day, with the danger of being carried over without consideration until the next session. In other words, the only possibility of killing the bill was to permit it to come up for consideration in Committee of the Whole. When thus brought up a motion to strike out the enacting clause of the bill would have been made, and votes enough to carry this point had been secured. Mr. Kelley's vote was strictly in accordance with rule 110 of the Manual (page 127), adopted November 13th 1794, and a part of the first set of rules made by Congress for the regulation of its proceedings. He could have voted in no other way without stultifying himself, as the protectionists who opposed Mr. Wood's motion and the too-ready newspaper critics have done. If the Wood tariff bill survives to plague the country through another session, it will be simply because a handful of overzealous obstructionists by factious opposition provoke Mr. Wood into withdrawing his motion to consider the bill in Committee of the Whole. Probably he would be glad of an excuse to do this. The friends of protection may well pray to be saved from such friends.

This is only one of many instances we might mention of the annoyance and wrong which good men and great men suffer at the hands of telegraphers and paragraphers. We count freedom of the press one of the bulwarks of our national liberties, and probably no citizen would consent to the abridgment of that power, but when that portion of the newspaper press represented at Washington converts itself into what General Butler with more force than elegance has described as a "forty jackass power mud-throwing machine," it is a sight calculated to make the judicious grieve. The member of Congress who is anything more than a silent ornament of an obscure seat, the responsible head of an important department, the cabinet officer and even the President, enter public life much as the bull enters the arena of the Plaza de Toros. To be unknown and useless is his only safety. The moment he takes a position which brings him into notice, that moment he is set upon by picadores, chulos and matadores, and worried with the banderillas and swords of telegrams and paragraphs, and thrust through with the spears of leading editorials. He is misrepresented, misinterpreted, slandered; his honesty is impugned, his motives questioned and his honor assailed at the bidding of the gentlemen in Washington, who are usually in too great hurry to have time for careful inquiry as to facts, and whose charges are carefully elaborated into specifications in editorial rooms remote from the scene of action. Men with tough hides and dull sensibilities may bear this without inconvenience; the ambitious and self-seeking politician may cling to office in spite of it; but the gentleman who has any fine feelings is stung and goaded into a frame of mind which unfits him for public service. To refute every misstatement concerning his acts and motives would be as idle as fighting hornets with a feather. More than one man of eminent capacity and unquestioned probity will this year decline renomination to Congress because his sensibilities and those of his family are constantly wounded by the outrageous and unwarranted attacks to which he is constantly subjected. Mr. Kelley is among this number, and although his notification to his constituents is positive and unequivocal, even that has been proclaimed to be the ruse of a wily politician to test the feeling in his district. Unless this needless and worse than mischievous persecution of public men ceases, gentlemen competent to sit in Congress or to discharge high and responsible functions in the government will refuse even to be candidates, or, if consenting to serve, will retire to private life after a single term—disheartened, disgusted and disappointed. We have more reason to fear the despotism of the telegram and the paragraph, which is driving gentlemen out of public life, than to believe that the stinging lashes of ignorant criticism and unwarranted censure are needed to keep our statesmen to their duty.

The Mining Engineers' Meeting.

The meeting of the American Institute of Mining Engineers last week in Chattanooga was a memorable event in the history of that society. As regards its scientific features, the meeting was less important than most of those which had preceded it. Only a few papers were read and discussed, but the time was very profitably employed in examining the features of interest in and about Chattanooga. The hospitable ironmasters and citizens of that promising young city had arranged so many excursions that but little time remained for meetings, and probably the visitors were more benefited by what they saw than they could have been by the reading of papers and by discussion. But few of the members present at the meeting had been in that part of the country. The accounts they had read of its great wealth of resources and its vast possibilities of industrial development naturally excited their curiosity and made them more eager to see the mines and iron works than to compare notes about more familiar and less interesting experiences. The unfortunate accident of extreme heat, quite unexpected so early in the season, entailed some inconvenience upon the excursionists, but all who attended the meeting were amply repaid by a better knowledge of the resources of the South and a pleasant remembrance of the hospitality of the people of Chattanooga.

American Trade Statistics for Nine Months.

According to the statistics of the Treasury Department, there have been imported into the United States during the first nine months of the current fiscal year $329,956,701 worth of merchandise, and re-exported $10,446,195, leaving a net import of $319,510,506, against an import during the corresponding period of 1876–77 of $315,507,268, less re-export of $9,922,004; net, $305,385,264. On the other hand we have exported of domestic products $522,584,420, against $460,361,256 during the first nine months of the previous fiscal year. The following table shows the details of articles of more immediate interest to our readers:

IMPORT OF SUNDRY GOODS DURING THE NINE MONTHS ENDED MARCH 30, 1878.

	Quantity. Thousands of pounds, &c.		Value. Thousands of dollars.	
	1878.	1877.	1878.	1877.
India rubber and gutta percha, lbs	10,217	10,325	3,916	4,172
Nitrate of soda, lbs	28,202	45,237	697	1,080
Block tin, cwts	110	68	1,863	1,244
Manufactures of brass	....	....	203	177
Bituminous coal, tons	452	410	1,495	1,486
Copper, ingots, lbs	356	1,367	47	207
Copper, manufactures	....	....	246	183
Cordage and twine, lbs	1,035	530	115	60
Stone and china ware	....	....	3,169	2,607
Window glass, lbs	19,965	17,654	687	745
Hemp, tons	14	12	1,543	1,279
Manuf'ures india rubber and gutta percha	....	....	209	261
Pig iron, lbs	87,954	111,119	892	1,134
Castings, lbs	80	64	4	3
Bar iron, lbs	49,853	41,584	1,193	1,153
Sheet iron, lbs	1,504	1,636	79	84
Old iron and scrap, tons	7	7	90	128
Hardware	....	....	82	74
Anchors and chains, lbs	1,477	2,543	77	131
Machinery	....	....	504	511
Firearms	....	....	256	263
Steel, bars, sheet and wire	....	....	897	979
Cutlery	....	....	997	692
Files	....	....	99	113
Tools and saws	....	....	6	10
Other manufactures of iron and steel	....	....	1,912	1,949
Jute, tons	32	32	1,738	1,506
Pig lead, lbs	7,338	9,137	327	422
Manufactures of lead	....	....	8	28
Leather, lbs	4,777	5,615	3,046	3,404
Manufact'es of metals	....	....	728	638
White lead, lbs	1,182	1,879	75	124
Litharge	139	316	8	23
Paints	....	....	527	481
Saltpeter, lbs	4,073	9,164	221	342
Bicarb'ate of soda, lbs	2,851	3,008	71	76
Carbonate of soda, lbs	182,429	159,169	2,677	2,529
Caustic soda, lbs	28,360	26,757	843	820
Acetate, &c., lbs	512	230	8	4
Tin plates, cwts	1,637	1,346	7,543	6,729
Tinware, &c	....	....	44	30
Spelter, in slabs, lbs	1,104	898	51	47
Sheet zinc, lbs	939	1,005	53	63
Total			39,246	37,991

EXPORT OF SUNDRY DOMESTIC GOODS DURING THE NINE MONTHS ENDED MARCH 31, 1878.

	Thousands of pounds, &c.		Thousands of dollars.	
	1878.	1877.	1878.	1877.
Fanning mills, number	125	133	2	3
Horse-powers, number	36	45	14	21
Mowers and reapers, No	4,857	4,271	481	417
Plows and cultivators, number	14,997	10,348	106	86
Other agricul. implements	....	....	938	560
Bells	....	....	11	10
Blacking	....	....	79	71
Manufactures of brass	....	....	257	129
Bricks, M	34	2	206	18
Brooms and brushes	....	....	109	123
Candles, lbs	1,183	1,064	167	155
Carriages	....	....	721	569
Railroad cars, number	569	441	470	413
Clocks	....	....	709	730
Coal, bituminous, tons	211	206	662	670
Ditto, other, tons	245	278	979	1,363
Copper ore, cwts	22	12	114	70
Ditto, ingots, lbs	7,666	11,320	1,502	2,285
Ditto, manufactures	...	....	209	183
Cordage and twine, lbs	2,625	1,724	298	221
Dyestuffs	....	....	392	519
Stoneware	....	....	77	67
Gas fixtures	....	....	44	23
Glass and glassware	....	...	614	493
Glue, lbs	116	46	17	9
Hemp, cwts	2	1	14	10
Ditto cables, cwts	7	10	106	139
Ditto, manufactures	....	....	769	529
Hides	....	....	760	1,834
Mfrs. of India rubber and gutta percha	....	....	208	262
Pig iron, cwts	108	32	130	48
Bar iron, cwts	23	39	61	138
Boiler plates, cwts	2	2	10	9
Rails, cwts	137	94	262	216
Sheet & hoop iron, cwts	2	4	11	19
Castings	....	....	215	168
Car wheels, number	4	6	50	90
Stoves	....	....	115	88
Locomotives	....	....	872	469
Steam engines	....	....	90	45
Boilers	....	....	79	52
Machinery	....	....	2,983	2,010
Nails and spikes, lbs	6,763	5,629	209	199
All other mfrs. iron	....	....	2,922	2,380
Steel in ingots, lbs	87	103	10	12
Cutlery	....	....	41	28
Edge tools	....	....	716	510
Files and saws	....	....	31	28
Firearms	....	....	1,964	4,300
Other mfrs. steel	....	....	267	201
Lamps	....	....	208	193
Manufactures of lead	....	....	119	41
Sole leather, lbs	21,545	19,043	4,832	4,571
Morocco	....	....	697	927
Manufactrs of leather	....	....	732	620
Cement, bbls	65	51	79	64
Stone and manufactrs	....	....	515	750
Matches	....	....	115	125
Scientific instruments	....	....	12	42
Musical "	....	....	571	719
Crude petroleum, gals	20,863	17,665	2,106	2,644
Naphtha, gallons	14,181	10,839	1,258	1,085
Refined petrol'm, gals	226,795	186,285	33,549	42,542
Lubricating oil, gals	1,648	911	459	294
Residuum	80	56	274	224
Cannon	....	....	6	12
Cartridges	....	....	3,199	1,809
Gunpowder, lbs	468	617	70	115
Shot and shell, lbs	4,559	4,432	1,367	916
Colors	....	....	168	136
Britannia ware	....	....	154	105
Presses and type	....	....	132	74
Quicksilver, lbs	1,771	2,797	889	1,304
Scales	....	....	151	110
Sewing machines	....	....	1,374	1,212
Spirits turpentine, gals	5,345	4,799	1,690	1,637
Steam engines	....	....	33	46
Manufactures of tin	....	....	69	45
Varnish	....	....	63	41
Watches	....	....	85	54
Wood and manufactrs	....	....	12,286	12,652
Zinc ore, cwts	13	4	70	23
" sheet & slabs, lbs	1,739	606	148	51
Total			89,553	98,003

The most notable items of increase in imports, it will be seen, are in block tin, cutlery and tin plates, while the import of white lead shows a great falling off.

Among exports there is an increase in plows and agricultural implements generally, as well as in manufactures of brass, fire-brick, carriages, glass and glassware, manufactures of hemp, of India rubber, pig iron, iron castings, locomotives, steam engines, machinery, edge tools, lubricating oil, cartridges, shot and shell, Britannia ware and spelter. There is an important decrease in anthracite coal, ingot copper, dyestuffs, firearms, morocco, marble, musical and scientific instruments, petroleum and quicksilver.

Iron and Phosphorus.

The relations of phosphorus to iron in the metallurgical processes have gradually usurped a great share of the attention of iron smelters and metallurgists. The growing importance of the subject is chiefly due to a change in the conditions of manufacture, though, to a certain extent, it must be accounted for by the fact that the methods of estimation of phosphorus have been materially improved, so that defects in the quality of iron which were formerly either overlooked or attributed to other causes, can now be proved to arise from the presence of that troublesome element. In former times the direct process was used more extensively than now, and as the conditions of manufacture were such that most of the phosphorus was eliminated, its presence in small amounts did not give serious trouble; and although in smelting in the blast furnace the phosphorus cannot be prevented from entering into the pig metal, the refining and puddling processes generally reduced the amount in the iron to such proportions that only in rare cases was the product worthless. When, however, the modern processes of steel making were struggling for a leading position, it was found that beyond certain limits phosphorus either seriously affects the product or makes it entirely unfit for industrial purposes. Careful research revealed the fact that the quantity of phosphorus in the bath is not diminished during the operation, and as yet all attempts to reduce the amount during the process have proved unsuccessful. Nothing remained, therefore, but a cautious selection of the material, a circumstance which, under the stimulating demand for suitable grades of pig, led iron masters to search for the causes of, and examine the conditions affecting, the presence of the dangerous impurity with a view to its elimination. By examinations of the raw materials used in the production of pig iron, it was found that the main source of phosphorus is the ore itself, and that it is rarely combined with oxide of iron, but generally with lime and alumina. Two methods naturally suggested themselves for the removal of these minerals—the use either of mechanical means or of chemical reactions. The great obstacle to a successful application of the former is the circumstance that, generally, the phosphorus minerals are so minutely divided and evenly distributed that no mechanical separation is possible unless the ore is reduced to a powder. Even if it could be efficiently and cheaply done after such comminution, the fine state of the purified ore would cause difficulties in the management of the blast furnace which, as yet, have not been surmounted, though frequent attempts have been made to utilize fine ore.

Besides a great number of proposals which were never submitted to the test of practice, all the methods employed on a large scale for the dephosphorization of ore have been abandoned, chiefly because they were too costly. We see, therefore, that the elimination of phosphorus from the ores is limited to hand-sorting in the mines, applicable in rare cases, and then of limited value.

To wholly or partially eliminate phosphorus during the reduction of the ore, has been found by experiment to call for certain modifications of the process which shall give us conditions somewhat different from those which now exist in the blast furnace. The most important of these seems to be that based upon the discovery that the lower the temperature at which the ore is reduced, the smaller the amount of phosphorus carried into the metal. Therefore, the aim of inventors and investigators has been to effect the reduction at moderate heats. Recently, however, some observations were made which tend to show that very high temperatures in the blast furnaces also favorably affect the amount of phosphorus in the pig. Dr. Wedding classes the methods of reduction by which the elimination of phosphorus might be possible in the following order:

1. Separation of the reduced iron and of the gangue in a solid state.

2. Separation of the liquified gangue—the slags—from the iron which has remained solid.

3. Separation of iron from the gangue when both are in a fluid state.

4. Separation of the gangue which has remained solid from the molten iron.

The first of these methods was tried by Chenot, but it failed because it was too costly and could not be readily adapted to all circumstances. The second is represented by the direct processes, the great difficulty in connection with which has been the heavy loss of iron attending it. The third would be a modification or an addition to the smelting in the blast furnace. The attempts in this line of experiment were chiefly directed to the volatilization of phosphorus by the addition of chlorine, fluorine, bromine or cyanogen compounds; as yet, they have proved failures. The fourth can only be carried out with difficulty. Dr. William Siemens' attempts to dissolve iron reduced at a low temperature from the solid accompanying gangue by bringing it into a bath of highly carburized metal, deserves careful consideration.

The most numerous, and perhaps the most satisfactory, experiments in dephosphorization have been made with pig iron. Much attention has been directed to this subject by the careful researches of Mr. Bell concerning the relations of iron to phosphorus at the various stages of the refining and puddling processes. One requirement must ab-

solutely be met if the purified product is to be used for making steel by the Bessemer process; it must be in a molten state for future manipulation. The elimination of phosphorus by carrying phosphoric acid into the slag is possible if oxide of iron is added to the metal to be treated. For this Mr. Bell has proposed molten oxides, while Mr. Friedrich Krupp uses solid oxides and a rotative furnace. The difficulty encountered, however, is that silicon is removed at the same time and a product obtained which is unfit for the Bessemer process. Of all the means employed up to this time only two give promise of success, each of which is linked to the name of an eminent English metallurgist: that carried out by Dr. Siemens and that to which Mr. Bell has devoted his attention. The problem is one which has great interest for American ironmasters, owing to the great abundance and cheapness of ores containing enough phosphorus to make the iron undesirably cold-short. The field for investigation and experiment is certainly an inviting one, and it is to be hoped that American metallurgists will make some important contributions to our knowledge on this subject which, it must be confessed, presents many and serious difficulties.

Cheapening of Fuels to Iron Makers in the South and West.

The fall in price of all grades of iron has probably been more nearly offset by reductions in the cost of fuel in the South and in some parts of the West, than in the Eastern and middle States. When the Chattanooga furnace first went into operation, early in 1874, the company paid about 11 cents for a very poor coke, and the article was not obtainable during that year below 10 cents. The same furnace is now supplied with coke of much better quality at a shade above 5 cents. The time is probably not far distant when furnaces and mills will be supplied in the Chattanooga market with a washed coke at $2 to $2.25 per ton, and there is no question that there are several beds of coal in the South which, with the advantage of washing, will make coke equal to the best known to the iron makers of Pennsylvania. When the Chattanooga furnace paid 10 cents for coke, the mills at that point paid 11¾ to 13 cents for coal for heating purposes, or $2.75 to $3 per ton. They now procure a better coal at $1.50 to $1.75 per ton. Furnaces and mills located near coal banks are supplied at a good deal less than the lowest price above stated. Some furnaces and mills in the Chattanooga district and in Illinois fully expect to be able to deliver coal from their own banks at the point of consumption at a cost of $1 per ton, or even less, during the balance of this year.

These facts probably account for the comparatively easy condition of the iron interest in the South. The cost of their fuel has decidedly been cheapened, their iron has been improved by the discovery of beds of superior ores and by the application of scientific methods of furnace management, and every item entering into the production of iron has experienced a decline verging close upon that which has been felt in the market for all kinds of crude and finished metal. These are the causes which have enabled the Chattanooga district to revive some old mills for making merchant bars, erect new mills and blow in old furnaces to a limited number, build nail mills and project steel works on a large scale. It has also enabled the makers to monopolize so much of a market as is furnished by local consumption, and to compete successfully with other districts in supplying pig and manufactured iron to the mills, foundries and large consumers of the West and Northwest.

Mr. A. L. Holley's paper "On Welding," which we print on another page, invites careful attention. Mr. Holley's utterances are always important, and his style of composition invests scientific discussion with a popular interest which in the hands of many eminent authorities it commonly lacks. Mr. Holley discusses all the phenomena of welding, and concludes that a perfect weld is due to fusion, and that imperfect welds are made by means of such contact of the surfaces united as may be got by partial fusion in a non-oxidizing atmosphere, or by the mechanical fitting of the surfaces, whatever the composition of the iron within known limits. Mr. Holley's reasoning is clear and intelligent, and it will greatly assist the practical reader to a better understanding of the theory and phenomena of welding, concerning which comparatively few workers in iron, and still fewer inventors of welding fluxes and compounds, have any clear idea.

The note by Mr. John Wister on the manufacture of coke from anthracite dust, which we reprint elsewhere from *The Metallurgical Review*, has much interest as suggesting a possible means of utilizing a waste material which is now the greater part of the mine product in anthracite mining. Mr. Wister's experimental results were very satisfactory, and he believes that if it should be found possible to make as good coke on a large scale as he has found it on a small scale, we shall at last have found a means of profitably utilizing the vast accumulations of anthracite culm surrounding the very wasteful breakers.

The series of valuable sketches by Prof. W. Mattieu Williams, entitled "Studies in Sheffield," the first of which we give on another page, will be found of much interest. The subject specifically considered is the reason for the relative advantages of iron and steel for certain uses, and some interesting personal experiences are given. Prof. Williams is a delightful writer, and always has something to say which merits consideration from both scientific and practical readers.

Extract from the Swedish Tariff.

*Iron and steel, free; coarse manufactures of iron, per cwt., 13½c. to 34c.; all other per lb., ¾c. to 3¾c.; some 10 per cent. and others 40c. per cwt.; cutlery, per lb., 1½c. to 13½c.; other steel manufactures, not polished, per lb., 2½c.; ditto polished, per lb., 7c.; tin in blocks and coarse manufactures, free; tinware, according to ornamentation, per lb., 3¾c. to 7½c.; spelter, zinc in slabs, sheets and bolts, free; plain zinc-ware, per lb., ¾c.; ditto painted and lacquered, per lb., 3¾c.; ditto gilt and plated, per lb., 7½c.; all ordinary metal ware, per lb., 3¾c.; ditto plated and ornamented, per lb., 7½c.; needles, per lb., 5c.; platina, both in the raw state and wrought, free; machinery, parts thereof and tools, free; copper ore, ingot and coarse manufactures, free; fish hooks, free; guns and fowling pieces, per lb., 5c.; copper-ware, plain, per lb., 3¾c.; ditto polished, per lb., 7½c.; shot, per lb., ¾c.; plain tin plate manufactures, per lb., 2½c.; ditto lacquered, per lb., 3¾c.; pig and all lead not manufactured free; plain manufactures of lead, per lb., ¾c.; ditto painted and lacquered, per lb., 3¾c.

Lead ore, free; lead pencils, per lb., 3¾c.; sugar of lead, free; ocher, free; type, free; bronze powder, per lb., 3¾c.; borax, free; white lead and zinc white, per lb., ¾c.; all other paints except indigo and cochineal, free; tin foil, per lb., 3¾c.; vessels and boats with inventory, free; gas meters, 5 per cent.; glass and glassware, from 20c. per cwt. to 2½c. per lb.; optical glasses, loose or set, free; all jewelry, free; bismuth, per lb., 3½c. Earthenware, per lb., ¾c.; china and porcelain ware, per lb., ¾c. to 5c.; marble in blocks or wrought, free; quicksilver, per lb., 3¾c.; all metals not named above, in the raw state, old or ready to be wrought; furthermore, sheathing and bolts for vessels, free; axle grease, per lb., ½c.; sperm oil, per lb., ½c.; oil cake, free; glue, per lb., ½c.; gelatine and isinglass, per lb., 20c.; tallow candles, per lb., ¾c.; other ditto, per lb., 1¼c.; wax, raw, free; sperm, raw, free; rosin, pitch and tar, free; horn and tablets thereof, free; ditto manufactured, per lb., 5c. to 13½c.; hides, skins and furs, free; prepared ditto, per lb., ½c. to 27c.; in some cases, 20 per cent. additional; horsehair, per lb., 2c.; petroleum, crude, per lb., free; ditto, refined, per lb., ½c.; asphaltum, free; bark, free; boneblack, per cwt., 20c.; printing ink, per lb., 1¼c.; cement, free; varnish and fine glue, per lb., 2½c.; all dye woods in sticks or ground, free; brushware, per lb., ¼c. to 5c.; school slates and slate pencils, free; india rubber, gutta percha, free; ditto hose and buffers, free; all other manufactures thereof, per lb., 10c.

Musical instruments: pianos, each, $10.80; grand pianos, each, $16.20; musical boxes, per lb., 13½c.; small musical instruments, like violins, &c., each, 13½c. to 27c.; organs, 5 per cent. Copper and other wire, gilt and plated, per lb., 27c.; wire, covered with silk, &c., per lb., 5c. to 6c.; all timber, lumber, cooperage stuff and plain woodenware, free; woodenware, painted and lacquered, per lb., ¼c. to 7c.; furniture pays woodenware duties according to quality and 20 per cent. additional; drays and carts, each, $1.35; sleighs, each, $4.05; carriages, each, $4.05 to $27; watches in gold case, each, 27c.; ditto, with other cases, 14c.; ships' chronometers, each, 27c.; watch and clock cases, metal, per lb., 7½c.; ditto, wood, per lb., 5c.; clock movements, per lb., 20c.; potash, free; saltpeter, soda and nitrate of soda, free; emery, free; stearine, 1c. per lb.; tallow, free; coal, coal tar and coke, free; turpentine, free; spirits of ditto, per lb., ¾c.; sulphur and manufactures, free; starch and maizena, per lb., 1½c.; hemp and jute, free.

The Elevated Railroads.

The New York Elevated Railway, east side, as we learn officially through Mr. Cowing, will commence running next Monday to Thirty-fourth street on a double track, and a month hence will operate the entire line to Forty-second street. There have been received already 21 engines and 39 cars, and 70 more cars are building by Gilbert, Bush & Co., of Troy, and the Springfield Car Company. The route here referred to is *via* Pearl street, the Bowery and Third avenue. The west side, comprising the original Greenwich street line (now made a double track), is not so far advanced.

The Gilbert road, through New Church, Chambers, West Broadway and Sixth avenue, is clearing up the track with the intention of putting on trains to-day (Thursday) so as to adjust the time table, regulating the starts and stops, and on Monday next will run on regular schedule time. This event is regarded by New Yorkers with deep interest, judging from the inquiries made. There have been received of the rolling stock 18 engines and 50 cars, out of 40 engines and 60 cars included in the contract.

A striking feature in the equipment is Hall's electric signal, operated by the motion of the train, so that as the cars approach each station an iron arm 5 feet in length is thrust out, red signifying "danger" and green "safety." This is done by the motion of the wheel on the battery. At night the signals are colored glass.

The switch platform and levers, located in New Church street below Trinity Church, are also worthy of notice. From a platform only a few feet square is a series of sixteen levers, all numbered to correspond with the various switches below, where all the engines are shifted from end to end, and all are manipulated by one man.

The great job of laying the "guard rails" was finished on Tuesday of this week, and as calculated for our reporter by the engineer, Mr. Van Brocklin, it comprises 22 lineal miles, all put down within seven working days. The job is in several respects extraordinary, as it was necessary within a brief period to gather the timber from Boston, Philadelphia, Baltimore and the West. Then there being a bolt to every 2 feet, there remained 58,000 bolts to be driven and an equal number of spikes to fasten a 2-inch by ½-inch iron bar to the guard timbers. The latter, it will be remembered, are 6 by 8 inches, two to each line of track.

* The Swedish coin is the same as the Danish. We have calculated the "crown" at 27c. of our money, and the "ore" at ¼c. The Swedish pound is nearly the same as the American.

Scientific and Technical Notes.

Mr. Henry Edmunds, Jr., of London, has discovered a beautiful method of showing variations in sonorous vibrations by means of luminous figures produced by a revolving vacuum tube, or what is commonly called

THE "GASSIOT STAR."

In this apparatus the membrane of a Reis transmitting telephone is used as the rheotome of an induction coil, of which the secondary wire is in circuit with a small vacuum tube which is rotated at a uniform speed by a small magnetic engine or other mechanical contrivance. It will be readily understood that as the vacuum tube is attached radially to the rotating disk of the motor, if, while it is spinning at a uniform speed, the current be made and broken once in any revolution, a single line of light will be observed, the position of which, whether horizontal, vertical or inclined, will depend upon the position of the tube during its revolution at the instant the flash passes through it. If three flashes per revolution pass through the tube, then their effect will be to produce a star of three rays, if six flashes, a star of six rays, and so on, the number of rays to the Gassiot star being identical with the number of the flashes or currents transmitted by the tube during a single revolution. There are, of course, other proportions between the number of flashes and the speed of revolution that would produce the same optical effect, but it is sufficient for the purpose of explaining the apparatus to assume the more simple and typical case. Upon sounding a note into the mouthpiece of the Reis transmitter, its membrane vibrates isochronously with the sonorous vibrations constituting the note; it therefore makes and breaks the primary circuit of the induction coil as many times per second, and a corresponding number of flashes is sent through the rotating tube. The effect of speech upon Mr. Edmunds' instrument is very remarkable, the figure produced being that of a star, the number of whose rays is constantly changing with great rapidity, and all the varying modulations and articulations of the human voice are instantly recorded by the form and appearance of the figure. Pure musical notes sounded in the instrument produce (at a uniform speed of rotation of the tube) perfectly regular figures, and the effect of two notes in harmony produce two distinct superposed figures, the one being bright and comparatively distinct, and the other appearing more nebulous and not so bright. The bright portions represent the coincidence of the phases of vibration of the two notes, and the nebulous portions correspond to phases which do not coincide with one another, but are seen in succession. The effect of discord is to break up all regularity of the figure, producing a merely nebulous haze in which occasional flashes may be seen.

An exceedingly interesting series of

PHOTOGRAPHIC EXPERIMENTS

was shown at the soirée of the Royal Society in London, by Mr. Francis Galton, F. R. S., by which portraits of different persons could be combined so as to form a new face altogether embodying certain characteristics of its components. Just as in a stereoscope, lenses or prisms are employed to form a single picture out of two others, so in Mr. Galton's experiments a lens or prism is used to superpose the optical image of one photograph upon that of another, and a perfectly new face is the result. Some of these combinations were most remarkable, not even difference of sex interfering with the result, and a combination of the faces of the Prince and Princess of Wales produced an exceedingly pleasant face, having a general resemblance to both its components, but no characteristic sufficiently marked to enable the observer to say to which it was due. Mr. Galton has produced these effects photographically as well as optically, and at the soirée he showed a large number of photographs of faces which had been produced by combining two, three, and as many as six portraits of different people. The operation is as follows: A set of photographic portraits of equal size are arranged one behind another, and fastened together by one edge like the leaves of a book, care being taken that the positions of the eyes of all the photographs exactly coincide; a camera is directed to the top portrait of the series, and after a short exposure the latter is turned back so as to present the second picture to the camera, and so on until the last is photographed. The resultant picture is a combination of all the others, and generally speaking is a decided improvement upon any of them. Mr. Galton gives as the value of this process the obtaining of anthropological types, the comparison of average features of a family with those of its near ancestry, and the power which it gives of obtaining a good likeness from many portraits of the same person.

One of the most beautiful as well as one of the simplest of new scientific inventions is

THE PHONEIDOSCOPE,

invented by Mr. Sedley Taylor. It is a simple instrument, embodying his experiments upon the action of sonorous vibrations upon liquid films stretched across the mouths of resonators of different capacities. The phoneidoscope consists of a short elbow of any suitable material (an inch and a quarter gas elbow would answer the purpose very well) attached to a stand, one limb being vertical and the other horizontal; to the vertical mouth is attached a small plate in which is cut an orifice across which a soap film can be formed by brushing over it a solution of castile soap and glycerine, and to the horizontal arm is attached about a foot length of large india-rubber tubing ending in a mouth-piece. The apparatus is therefore somewhat similar to a Reis transmitter, in which the membrane is replaced by a film of soap solution. In using the instrument, a soap film having been formed across the orifice the apparatus is placed between the observer and a source of light in such a position as to reflect the light to the eye. When the bubble has become sufficiently thin to exhibit the colors of thin films, it is ready to exhibit the phenomena. A note being sounded into the mouth-piece, the colors which before had been floating about without order or form suddenly arrange themselves in beautiful patterns similar to the sand figures in Chladni's experiments, and between the nodal lines may be observed vortices of color rotating with great rapidity in opposite directions and producing a magnificent effect of form and color. Upon varying the note the patterns rapidly change, each note having its own definite arrangement of nodes and vortices. For varying the figures the top orifice plate is removable and can be replaced by others having differently shaped orifices, some being circular, others square, some triangular, and others polygonal, the form of orifice, as does that of Chladni's plates, affecting the sound figure produced when the vibrating surface is under the influence of sonorous vibrations.

The first complete analysis of

LAKE SUPERIOR COPPER

was communicated to *The Metallurgical Review* for June by Dr. W. Hampe, of the Royal School of Mines at Clausthal. As the following figures show, the purity of the metal is remarkable. The brand examined was the Minnesota:

Copper	99.8937
Silver	0.0284
Lead	trace.
Antimony	none.
Arsenic	none.
Bismuth	none.
Sulphur	trace.
Iron	0.0077
Nickel and Cobalt	0.0146
Oxygen	0.0342
Total	99.9786

The specific gravity was found to be 8.5155.

Tables for the Interconversion of English and Metric Units.

BY PERSIFOR FRAZER, JR., A. M.

Presented to the American Philosophical Society, April 5, 1878.

1 cubic inch water weighs = 252.7574 grains.
At max. dens., Bar. 30 in. Air 62° F. (Barnard.)
1 cubic foot water weighs = 62.3949696 lbs.
1 cwt (112 lbs.) = 50.80238 kilos.
Quarter (28 lbs.) = 12.700595 "
Drachm = 1.77185 grams.

LINEAL UNITS.

Inches.	Centimeters.	Feet.	Meters.
0.3937079	= 1	1	= 0.3047945
1	= 2.539954	3.2809	= 1
0.787416	= 2	2	= 0.6095890
2	= 5.0799	6.5618	= 2
1.181124	= 3	3	= 0.9143835
3	= 7.6199	9.8427	= 3
1.574832	= 4	4	= 1.2191780
4	= 10.1598	13.1236	= 4
1.968539	= 5	5	= 1.5239724
5	= 12.6998	16.4045	= 5
2.362247	= 6	6	= 1.8287669
6	= 15.2397	19.6854	= 6
2.755955	= 7	7	= 2.1335614
7	= 17.7797	22.9663	= 7
3.149663	= 8	8	= 2.4383559
8	= 20.3196	26.2472	= 8
3.543371	= 9	9	= 2.7431504
9	= 22.8596	29.5281	= 9

Yards.	Meters.	Miles.	Kilometers.
1	= 0.9143835	0.6214	= 1
1.093633	= 1	1	= 1.6093
2	= 1.8287669	1.2428	= 2
2.1873	= 2	2	= 3.2186
3	= 2.7431504	1.8641	= 3
3.2809	= 3	3	= 4.8279
4	= 3.6575340	2.4855	= 4
4.3745	= 4	4	= 6.4373
5	= 4.5719174	3.1069	= 5
5.4682	= 5	5	= 8.0466
6	= 5.4863009	3.7283	= 6
6.5618	= 6	6	= 9.6559
7	= 6.4006845	4.3497	= 7
7.6554	= 7	7	= 11.2652
8	= 7.315068	4.9711	= 8
8.7491	= 8	8	= 12.8745
9	= 8.2294514	5.5924	= 9
9.8427	= 9	9	= 14.4838

AREA.

Sq. inch.	Sq. centimeter	Sq. feet.	Sq. meter.
1	= 6.451367	1	= 0.09290
0.1550059	= 1	10.76393	= 1

Sq. yard.	Sq. meter.	Sq yards.	Are.
1	= 0.8360972	1	= 0 00836097
1.19603326	= 1	119.603326	= 1

Rood.	Are.	Acre.	Hectare.
1	= 10.11678	1	= 0.404671
0.098845	= 1	2.471143	= 1

Thermometer. Fahrenheit, Degrees.	Centigrade. Degrees.	Heat units. 1 lb. water. 1° Fah.	Calories. 1 kilogram. Water 1° C.
1	= 0.55556	3.96832	= 1
1.8	= 1	1	= 0.251996

CAPACITY.

Cubic inches.	Cubic Centimeters.	Cubic foot.	Cubic decimeter. (Liter.)
1	= 16.38617589	1	= 28.315312
0.06102705152	= 1	0.35331658	= 1

Cubic ft.	Cub. m. (Stere.)	Cub. yd.	Cub. m. (Stere.)
1	= 0.028315	1	= 0.76451470
35.31658	= 1	1.3080215	= 1

Minim.	Cub. cent. m.	Fluid oz.	Cub. cent. m.
1	= 0.0616082	1	= 29.5719289
16.23158	= 1	0.033815	= 1

U. S. pint. (Wine.)	Liter.	U. S. gal. 231 c. i.	Liter.
1	= 0.47315083	1	= 3.7852067
2.1134908	= 1	0.264186	= 1

U. S. wine bbl. (31.5 gals.)	Liter.	Gal. (Imp.)	Liter.
1	= 119.234017	1	= 4.54345728
0.00838686	= 1	0.2200967	= 1

U. S. bushel. (2150.42 c. i.)	Liter.	Cord.	Stere. (Cubic meter.)
1	= 35.2371556	1	= 3.624360
0.028379135	= 1	0.275911	= 1

Solid perch. (25 cub. ft.)	Cubic m. (Stere.)
1	= 0.7088828
1.412663	= 1

WEIGHT.

Pounds to foot.	Kilos to meter.	Pounds to sq. in.	Kilos to sq. centimeter.
1	= 1.48819	1	= 0.0703096
0.6719572	= 1	14.22282	= 1

Grains.	Grams.	Lbs. (Av.)	Kilograms.
1	= 0.06479895036	1	= 0.453592653
15.43234874	= 1	2.2046212	= 1

Oz. (Av.)	Grams.	Lbs. (Troy.)	Kilograms.
1	= 28.349541	1	= 0.373241954
0.035274	= 1	2.679227	= 1

Tons.	Tonnes. (1000 kilos.)
Long (2240 lbs.)	= 1.0160475
Short (2000 lbs.)	= 0.9071853
Long, 0.9842059 / Short 1.1023106	= 1

Grains per U. S. gal.	Milligrams per liter.	Foot Pounds.	Kilogrameter.
1	= 17.1189987	1	= 0.138253
0.05841463	= 1	7.23314	= 1

Staffordshire Rural Locksmiths.

The *Ironmonger* says: Within ten miles around Wolverhampton are several rustic villages undisturbed as yet by the overspreading smoke and flame of the Black Country, in which the locksmiths' craft is still pursued under conditions differing little, if any, from those which prevailed a century ago. Some of them are in a district rendered historical by the escapades of King Charles, and so little changed are they, after the lapse of 200 years, that were some Rip Van Winkle, in the guise of a cavalier or a roundhead, to awake after those decades of slumber, he might fancy he had not exceeded "forty winks." Into these quiet rural scenes of industry no "trade reporter" enters to chronicle the ups and downs of business. The town of Wolverhampton itself has the credit of all these village products, and so the village locksmiths go on, year after year, in the old ways, and under the most primitive conditions, yet doing their work as honestly and as well as scanty earnings and the ever-increasing competition of steam machinery will admit. Let us glance at the chief of these village haunts of the locksmiths.

Brewood is a quaint old-world village, with an ancient church, and a steep street of gabled homesteads leading up to it. Within a mile are the the grand old woods of Chillington. Here, in all sorts of queer out-of-the-way corners, are to be found little workshops where plate locks—known in the trade as "fine-plate," and "best-fine"—are produced in countless dozens. The Brewood locksmiths do not complete the locks they make. They produce the working part only, the addition of the wood case being made at Wolverhampton, by the firms on whom the villagers depend for their employment. Coven, an adjacent hamlet to Brewood, has also a little colony of locksmiths engaged in the same trade, and some few are also to be found at Calf Heath, near Penkridge. There is some talk of constructing a railway to Brewood, and Lord Bradford is said to favor the movement.

About five miles from Wolverhampton, in a northeasterly direction, are the twin-villages of Short Heath and New Invention. They are both long straggling hamlets, certainly not destitute of rural charms, but not so pretty as Brewood and Coven, though equally difficult of access. New Invention owes its odd name to a simple circumstance. The first house built there had a smoky chimney, and the occupant of the house—an ingenious old dame—contrived a home-made and rather odd-looking chimney cowl, which attracted the notice of the passers-by. In answer to numerous inquiries, the old dame used to say, "It's a new invention, and it's a perfect success." The "new invention" got to be a household name roundabout, and, in time, it became the recognized name of the locality. The locks produced at Short Heath and New Invention are the cheaper kinds of iron, till, chest and cupboard locks. Nearly all the manufacturers are in a small way of business, and, in olden times, they were great employers of indoor apprentices. The industry has considerably diminished during the last few years, the decline of the American demand—which, at one time, was the principal—having largely and seriously affected it. During the "coal famine," four or five years ago, many of the locksmiths laid down the hammer and the file in disgust at the low wages, and tried their luck in the coal pits. Since that time the trade has revived somewhat, but it is still in a far from flourishing state.

Wednesfield—anciently called Wodensfield, and the site of a great victory by the Saxons over the Danes—is another lock-making village about two miles from Wolverhampton. Chest and cupboard locks and cheap padlocks are the staple branches, and keys are produced rather extensively for the locksmiths in the neighboring town of Willenhall. Bloxwich, an old-fashioned village between Walsall and Penkridge, about two miles from the former place, has of late years become a center for railway carriage lock manufacture, but its leading product is, and has for generations been, saddlers' ironmongery, chiefly for the supply of Walsall firms.

Distress in the British Hardware Centers.—The *Ironmongers' Review* says: The distress among the working classes in Sheffield increases, and it is probable that some public effort will be made to alleviate it. It is a remarkable fact, and shows how severe must be the depression in some of the chief industries, that the distress is the greatest in parts of the town which a few years ago were the most prosperous. Men who were then earning good wages at iron works, steel houses, and in similar large establishments, are now in the deepest poverty. In large numbers of cases almost everything that could be converted into money has long since gone to the pawnbrokers; furniture, beds and clothes have been sold to get food and these means being now exhausted, their condition is that of abject want. At Attercliffe, a part of the town which is near some of the largest works, soup kitchens are being established, and a day or two ago 170 families were provided with soup and bread. But this is only like a drop in the ocean. In the neighborhood of the school room, used as the kitchen, there are several streets occupied by artisans, and in scarcely a single house in all of them can a man be found who is working full time. The great majority are working but a day or a day and a half a week. Many are out of work altogether, and though willing to do anything, are unable to find employment. The Atlas and the Cyclops works, which usually give employment to a great number of men, resumed operations last Monday for the first time since Christmas. In each the ironworkers have gone in on reduced wages, and this tends to increase the distress. A few days ago the mayor summoned a few of the clergymen whose parishes are where the distress largely prevails, together with others who could give him information. The result of the interview was that he gave £100, and said he would be responsible for £500 more, this amount to be at once used in mitigating the distress.

AMERICAN SCREW CO.,

Providence, R. I.,

MANUFACTURERS OF MORE THAN 4000 VARIETIES OF PRODUCT,

AND INCREASING THE ASSORTMENT DAILY.

Machinery employed contains important inventions recently patented, and which are designed to produce Screws at a **lower cost to the consumer** than has ever been attained.

All goods are distributed through the Hardware trade, to whom a liberal discount will be allowed.

(*No. 235.*)

INTERNATIONAL EXHIBITION.

PHILADELPHIA, 1876.

The United States Centennial Commission has examined the report of the Judges, and accepted the following reasons, and decreed an award in conformity therewith.

PHILADELPHIA, November 8, 1876.

REPORT ON AWARDS.

Product: **Iron, Brass and Steel Screws, Tire and Stove Bolts, Rivets.**

Name and address of Exhibitor: American Screw Company, Providence, R. I.

The undersigned having examined the product herein described, respectfully recommends the same to the United States Centennial Commission for Award, for the following reasons, viz:

Being of a quality nearly approaching perfection, showing the highest attainment in this branch of manufacture.

G. L. REED. Signature of the Judge.

Approval of Group Judges.

Daniel Steinmetz, G. L. Reed, J. Diffenbach,
Jas. Bain, J. D. Imboden, Dav. McHardy.
Chas. Staples,

A true copy of the record. FRANCIS A. WALKER, Chief of the Bureau of Awards.
Given by authority of the United States Centennial Commission.
A. T. GOSHORN, Director-General.
[L.S.] J. L. CAMPBELL, Secretary. J. R. HAWLEY, President.

After forty years' experience we offer to the trade our Centennial Screws, patented May 30, 1876, as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the improved article only. To introduce them, they will be sold at the same price as the old style screw.

The new screws will be packed in manila colored boxes with the new label covering end of box, and enlarged figures showing plainly contents.

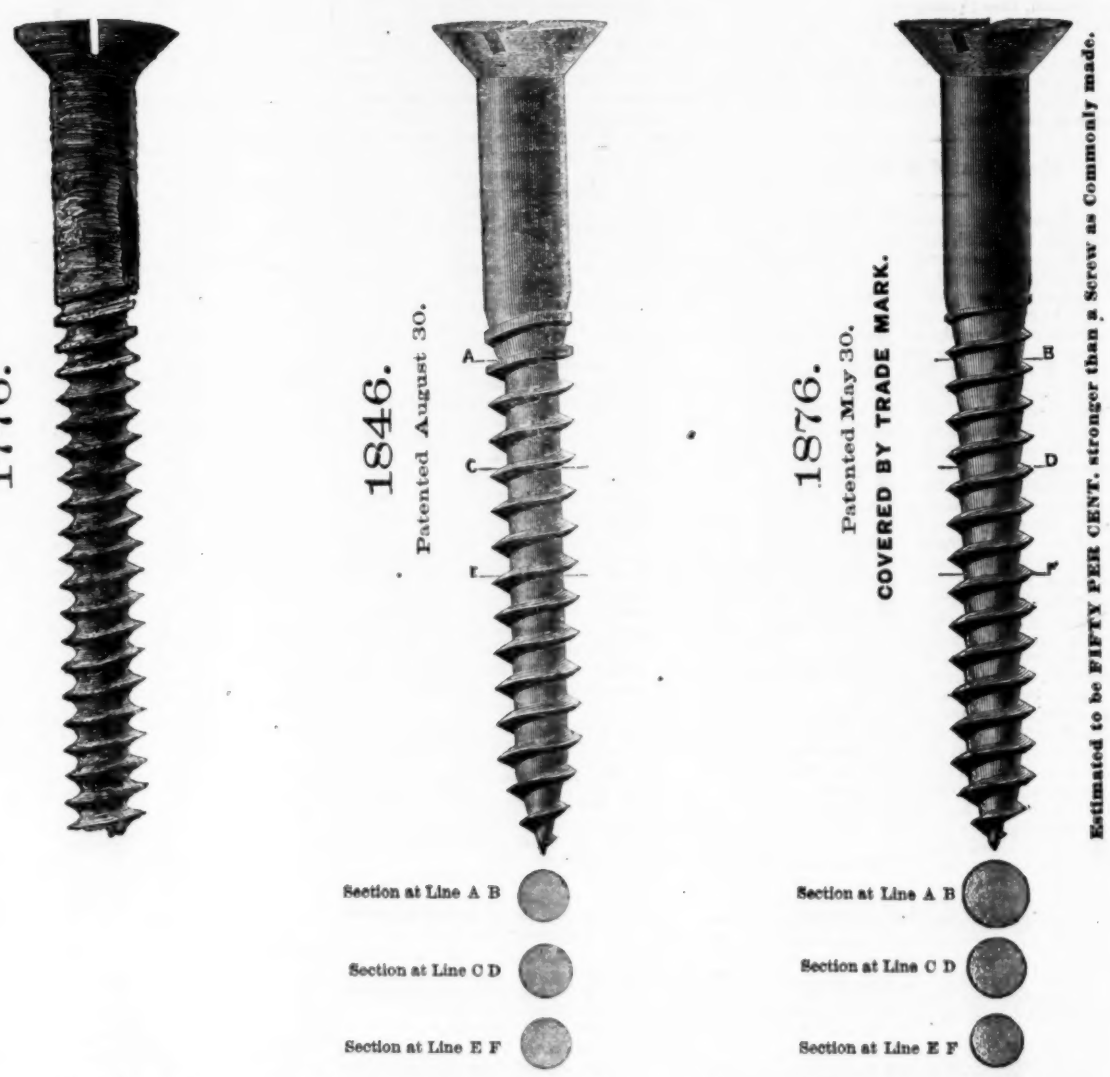
To distinguish this screw we have adopted a trade-mark, which is also secured to us.

The accompanying engravings show the progress of making screw from the old blunt point to style now adopted.

Experience has shown that the weak point of screws, as formerly made, is at the heel of the thread, where all the strains of forcing the screw into the wood naturally concentrate.

To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

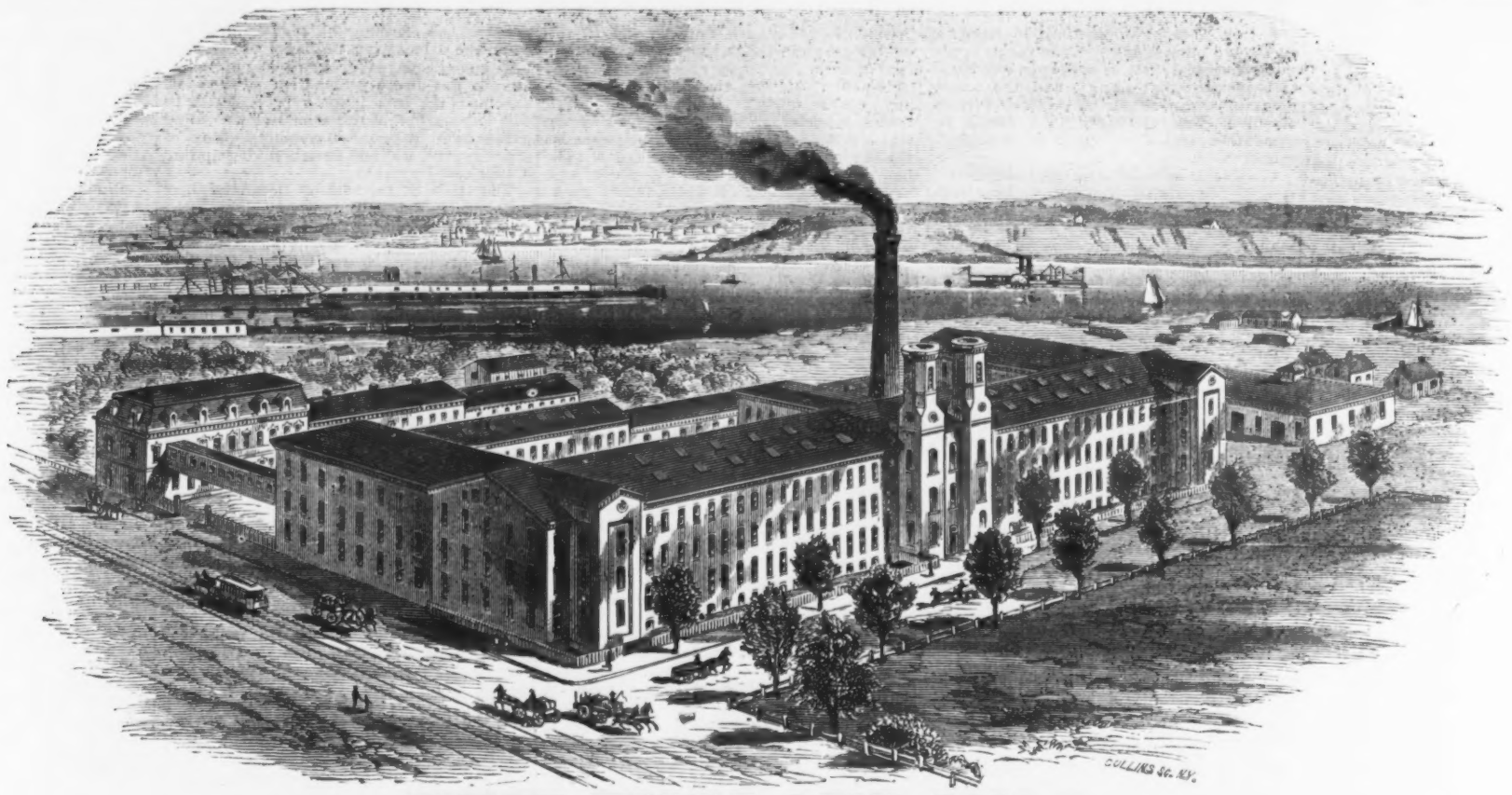
It will be seen in our new screw that not only is the sharp angle avoided, but the strength very much increased, as illustrated. See sections at lines.



CLAIM.

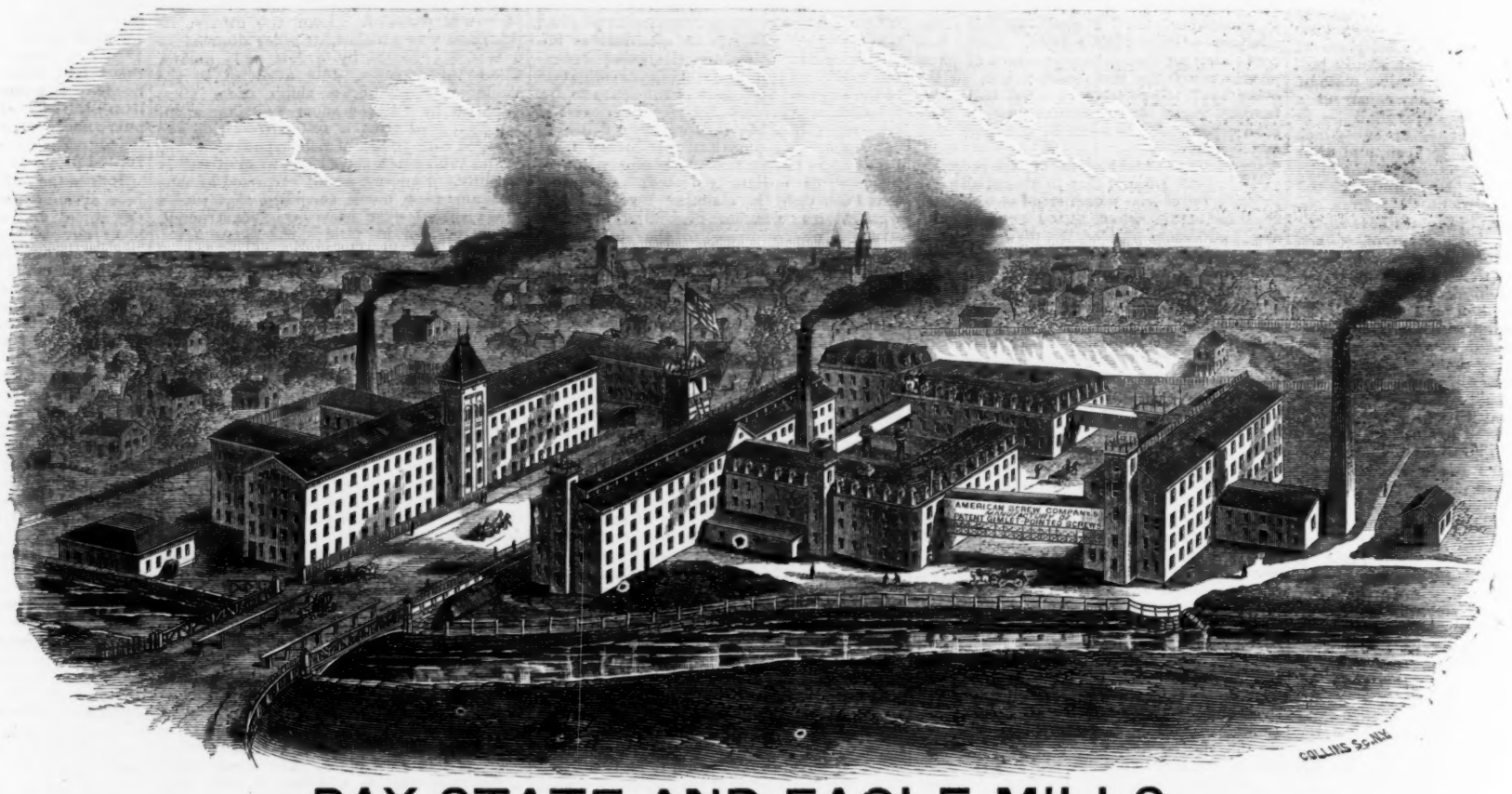
"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

On the opposite page will be found illustrations of the various Works of the company.



NEW ENGLAND MILL.

Containing Machinery for the Production of 22,500 gross of Screws per day.



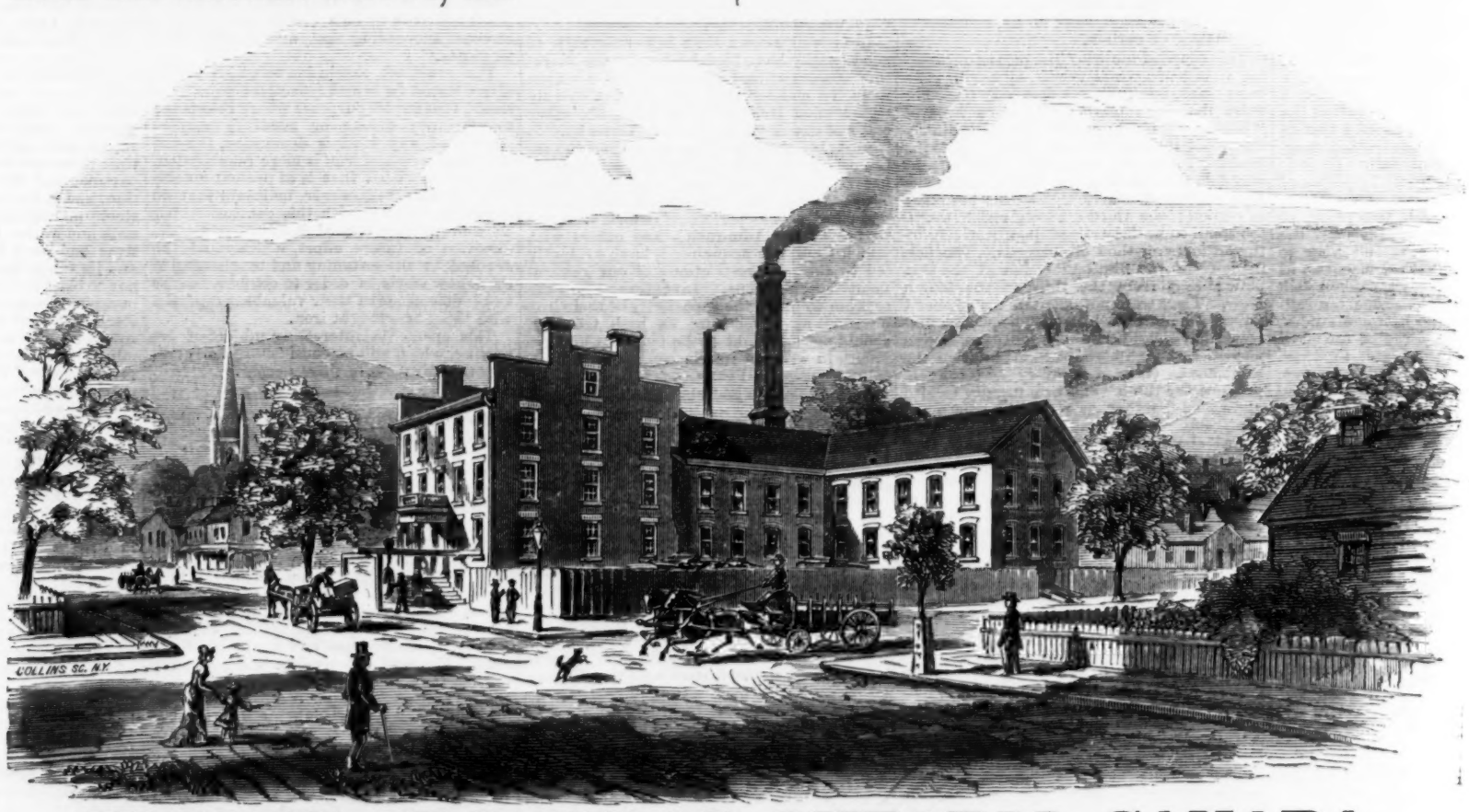
BAY STATE AND EAGLE MILLS.

BAY STATE MILL,

For the Production of Stove Bolts, Tire Bolts, Rivets, Lock and Machine Screws, &c.

EAGLE MILLS.

Capacity 22,500 gross Wood Screws per day.



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Studies in Sheffield.

BY W. MATTIEU WILLIAMS, F. C. S., F. R. A. S.

I.—Iron *versus* Steel.

If inventors were judged by their phraseology, we should be forced to conclude that those concerned in the progress of iron metallurgy are very dangerous, revolutionary people. Almost every improvement of any pretensions has been heralded, either by its inventor or admirers, as an invention that will effect "a revolution in the iron trade." The particular revolution most prominent and popular at the present moment is that which is to be effected by the superseding of iron by steel. So far as rails and tires are concerned, we may safely regard the revolution as actually consummated; but at the risk of being overwhelmed by the still-swelling current of metallurgical public opinion, I venture to repeat my frequently expressed skepticism respecting the alleged or assumed superiority of steel to iron for many of the purposes to which its application is proposed, and will state more definitely than hitherto my reasons for such skepticism.

Why is the mild steel produced by the Bessemer, the Siemens-Martin process, &c., better suited for rails and tires than wrought iron? This question is easily answered, and is open to no controversy. It is, first, because the material is harder and less fibrous, and therefore resists the crushing or squeezing-out wear of rails, or the grooving wear of tires, for a far longer time than wrought iron; and, secondly, because it is more homogeneous, and therefore wears more uniformly. We may safely conclude that for all other purposes where the material is subject to this kind of wear and tear only, the steel will display a similar superiority. But the revolution is proposed to extend to boiler plates, ship plates, girders, angle iron, T-iron and all other structural elements. Steel is to supersede iron in the construction of bridges, guns, armor plates, &c. Let us take some of these in order and separately, beginning with boiler plates.

It is argued that steel is a better material than iron for boiler plates because its tenacity is greater; that, as a piece of steel plate of given sectional area will resist a steady pull 50 per cent. stronger than a similar plate of wrought iron can bear, we may construct a steel boiler of ¼-inch plate that shall be as strong as an iron one of ⅜, or of ½-inch steel plate as strong as ¾ iron, and thus gain the advantage of lightness combined with equal strength, besides diminishing the resistance to the passage of heat from the furnace to the water. The data here stated are unquestionable. As a strip of ¼-inch plate of fair quality of mild steel will stand a pull quite equal to that which is borne by an equally wide strip of ⅜ good quality wrought-iron plate when both of these are tried by tearing asunder with a testing machine, the above-stated conclusion appears unquestionable, seeing that the strain upon a boiler is a tensile strain, and a boiler can only burst by an actual tearing asunder of its material. In venturing to question these conclusions, I am bound to state my reasons rather fully, and will do so accordingly.

In 1868 and 1869 I made some experiments which led me to suppose that I could materially improve the quality of wrought iron by mixing oxide of manganese with the ordinary "fettling" of the puddling furnace, and I became accordingly a patent-office victim. In working this invention I tested the iron produced thereby in the usual manner, and obtained the reports which inventors usually obtain concerning the high tenacity, the extension, contraction of area, &c., &c., of my improved iron. Just at this time the firm of Sir John Brown & Co., of Sheffield, were competing for a government contract for bolts for armor-plated ships, and the government inspector, an officer of the Engineers, was at the works testing several specimens of iron offered for the purpose. Newspaper writers at home and politicians abroad commonly imagine that the officials of the British Ordnance and Admiralty departments are all of them mere *dilettante*—fine gentlemen with very little practical knowledge of mechanical subjects. My own experience contradicts this notion very positively. In the present instance the officer that came down from London paid but little attention to the tensile extention, contraction of area, &c., tests of the iron offered for bolt making. He argued that the bolt which holds the armor plates of a ship to their backing is not liable to such a gradually applied strain as the pull of the hydraulic press or the big screw of a testing machine, but has to resist the sudden, tearing crash of a heavy cannon ball. To imitate this, he had the iron made into bolts of the size required, viz., 3 inches diameter. These were passed through two pieces of armor plate, and secured by the head of the bolt at one end and the nut at the other to pieces of armor plate as they would be in the ship's side. The enemy's cannon ball was represented by a weight of one ton falling from a hight of 30 feet between guides, and so arranged that the force of the blow was delivered on the lower plate, to which the tail of the bolt was attached by the nut, while the plate holding the head was held firmly. The blow thus effected a suddenly delivered tearing strain upon the bolt, acting fairly in the line of its axis, and representing the strain to which a ship's bolt would be subjected when a ball had penetrated the armor and was crashing through the backing to which the armor is bolted.

The results of this "drop test" were that bolts made of certain peculiar qualities of iron stood as many as four blows before breaking. They stretched considerably at each blow, thinning to contracted waists at certain parts, the position of which was by no means constant. At the places where the maximum stretching occured, curious symptoms of "distress" were displayed. There were pimples and ridges on the originally smooth surface of the bolt, evidently due to the pressure of hard, unyielding portions embedded in the more plastic material of which the bulk of the bolt was composed; showing that even the best of wrought iron is far from homogeneous. Many gave way at third, second or first blows. I am forced to confess that every bolt made from iron produced by my patent manganese-puddled iron broke most ignominiously and carrot-like at the first blow. This was the more humiliating, inasmuch as all the ordinary tests—hot and cold bends, ram's-horn test, holeing test, fractures,&c.—had given brilliant results, and the tensile breaking strain, as tested by the hydraulic machine, was unusually high, with the elongation and contraction of area quite satisfactory.

Considerable training in the endurance of disappointments enabled me to bear this; but, instead of giving it up altogether, I endeavored to discover why a sample of iron standing a direct steady pull of about 30 tons to the square inch of sectional area should break at the first blow under the drop test, while another sample only bearing 22 or 23 tons of ordinary tensile strain should hold on to the fourth blow. A good opportunity of conducting this investigation was afforded by the stock of broken bolts which remained and were duly and systematically numbered in correspondence with the reports of a long series of drop-test experiments. Having long been on very bad terms with phosphorus, which I had already proved to be guilty of much more mischief than at that time was attributed to it, I first supposed that phosphorus was the sole offender in this case, and accordingly selected a number of bolts that had stood the tests exceptionally well, and others of varying degrees of inferiority I took borings from these and analyzed for phosphorus.

The first six examined gave the following results:

	Per cent.
A—Very good fracture and extension, broke at 4th blow, contained	0.02
B—Very bad fracture and extension, broke at 1st blow, contained	0.15
C—Bad fracture and extension, broke at 1st blow, contained	0.07
D—Bad fracture and extension, broke at 2d blow, contained	0.13
E—Good fracture and extension, broke at 4th blow, contained	0.07
F—Good fracture and extension, broke at 4th blow, contained	0.05

Here was an indication that phosphorus had something to do with the mischief. It might be found guilty on the evidence of A and B, but that of C and E was suggestive of something else. I made several other analyses with similar results. Every bolt containing an excessive percentage of phosphorus stood the test badly; but, on the other hand, there were rejected bolts containing very little phosphorus—no more than other good bolts—as in the cases of C and E above.

On further examination of the recorded experiments, I found that in almost all cases the samples of iron which stood an excessive breaking strain when tested by the gradually increasing pull of the hydraulic machine, failed when subjected to the drop test, just as my manganese iron did. For example, a steely iron containing 0.18 per cent. of combined carbon, which showed a breaking strain of 34.18 tons per square inch with an elongation of 12 per cent., broke at the first blow of the drop test with scarcely any elongation. The iron finally selected and used for making bolts showed a breaking strain of 22 to 24 tons per square inch, and usually broke at the fourth blow with good elongation. This, of course, pointed to carbon as an accomplice with phosphorus. I had already discovered, in the course of my experiments with the manganese fettling, that the first ball drawn from the puddling furnace differed materially in some respects from the second and third. The iron made from the first ball bore a stronger pull in the hydraulic testing machine than that from the second, and the second more than the third. The first ball bore most of the hot tests (punching hot, bending, &c.) better than the third, and generally the third bore the cold bending tests better than the first. Analysis showed that they all contained an appreciable amount of carbon, and that this was always greatest in the first ball and progressively less in the later balls. To test this the more severely, I had some heats made into four or five balls instead of the customary three. The reason of this is obvious enough. The ball of spongy, uncompressed iron, as it stands in the puddling furnace waiting its turn at the hammer, is undergoing oxidation, but the oxygen first attacks the carbon, which continues to protect the metal so long as it remains in sufficient quantity, and thus the only difference between these different balls from the same heat is their different proportions of carbon.

This supplied me with the means of making an *experimentum crucis*, by having two bolts made, one from the first ball, the other from the third ball of the same heat of "best best" iron puddled in the ordinary way; but the first ball was hurried off to the hammer as sharply as possible and the third was delayed rather more than usual. The first contained nearly two-tenths per cent. of carbon; the third a barely visible trace, too small to be determined quantitatively by the ordinary method of analysis. The bolt made from the first ball broke at the first blow; that from the third at the fourth blow. They were not officially tested, but I have no doubt that had they been, the first would have been rejected and the second accepted, though both were made from the same heat. (I need scarcely add that in practice the three balls are usually welded and rolled together, and thus a bar of mean composition is obtained.)

The above details are given because they have a direct and, I think, important bearing upon the question now occupying so much attention among the metallurgists of all nations. In the case of these bolts, the steely attributes were directly detrimental. Increased tenacity, as measured by the application of a gradually increasing strain, was accompanied by increased weakness in relation to a sudden shock. The case is an extreme one undoubtedly, and the test excessively severe; but admitting this as regards degree, does it not represent the kind of strain to which boilers, girders, ship plates, bridges and all structural applications of iron or steel are more or less subject.

Let us take a boiler first. While the heat is being gradually applied, the expansive force of the steam gradually developed and the boiler firmly at rest, the plates are submitting to a strain fairly represented by the hydraulic or screw testing machine; but if, when the metal is thus strained, the boiler is submitted to any kind of shock, the conditions are entirely changed. A vibration traverses its structure; waves of compression and extension suddenly add to the tearing strain of the expanding steam in one place and diminish it in another. In proof of the effect of this, the following experiment may be made by anybody who has a testing machine at command. When the strain is approaching the breaking point, let the bar or plate under trial receive a light but smart tap sufficient to produce a molecular vibration. It will instantly break, even though at a considerably less strain than would have broken it if undisturbed. The boilers of all kinds of marine engines and of locomotives are subject to violent vibratory shocks. Suppose we have two boilers, one of steel and the other of soft malleable iron, and both have been tested by hydraulic pressure to the same extent. Which would be the most likely to give way under practical conditions, and subject to ordinary and extraordinary shocks while worked nearly up to their tested pressure? If compelled to sit on the safety valve of one or the other, I should choose the soft iron.

It is well known that some of the worst cases of boiler explosion have occured very unaccountably, as though some sudden generation of expansive force had occurred. The spheroidal state of water, its decomposition by the over-heated plate followed by explosion of the gases, and other theories have been invented to account for these. The fact of sudden shock of some kind can scarcely be disputed, and steel plates, if I am right, would, in spite of greater tenacity to steady strain, be the weakest when subjected to such sudden violence.

Girders and the supporting element of bridges are so especially liable to vibratory shocks, that mere tenacity under a gradually applied and steady strain is of little or no value in reference to them, unless it indicates a corresponding resistance to the particular shocks which most endanger their stability. The experiments above described, so far as they go, indicate very ominously that such is so far from being the case that a high degree of tenacity actually indicates practical weakness. I say "so far as they go," being fully conscious of the inadequacy of so small a series of experiments to establish so important a conclusion, and the great desirability of further and searching investigation of the subject, especially in reference to different kinds of shock. A rigorous course of researches should be instituted, in order to determine with quantitative accuracy what I may term the neutral or turning point of tenacity as ordinarily tested. Assuming that I am right in claiming for good soft wrought iron a higher degree of practical strength or resistance to the shocks and strains to which structures are subject than steel, it is very desirable to determine the tenacity of good iron as compared with the higher tenacity of steel, and lower tenacity of bad iron, in the condemnation of which we all agree.

In advocating these further investigations, I am not forgetting what is actually and commonly done in the application of the drop test to steel rails, &c., and am aware that much has been done at our British arsenals, though not acquainted with the details of all these experiments. Their teachings are suggestively indicated by a fact which I learned when collecting some specimens for illustrating the Cantor lectures of 1876, viz., that in the latest specifications of the British government for "angle, bulb or bar steel," one of the fundamental requirements is that "the whole of the steel shall stand a tensile strain of 26 tons to the square inch and not exceed 30 tons to the square inch." This indicates a considerable revolution in authoritative opinion, for in February, 1869, when I ventured, in the course of a controversy in the *Chemical News*, to assert the fallacy of testing steel by its tensile strain without reference to its power of resisting a vibratory shock, I stood in opposition to high authorities, who, having found that some specimens of steel containing a very unusually large quantity of phosphorus resisted a tensile strain nearly double that now demanded by the above quoted specifications, argued that therefore the steel must be good, and that eommonly received notions concerning the mischief of phosphorus are erroneous. (See *Chemical News*, vol. xix, pp. 58, 85, 95, 117, and Chemical Society's meeting of January 21, 1869.)

It is well known that Bessemer rails of good quality have been broken by the vibratory shock received in falling from a wagon in such a manner that one end has sharply struck upon stone or metal while the other end has struck upon a similar material. It is probable that in these cases the fracture has occurred where the undulations proceeding from each end have met each other. These facts, the results of the above described bolt experiments (which were reported to the Admiralty), and others with which I am not acquainted, have evidently led to the wise restrictions of our government specifications. Inventors who are seeking to prove the superiority of their iron or steel by advertising its high tenacity, should not lose sight of the fact that high tenacity in wrought iron is usually an indication of unremoved carbon.

I need scarcely add that all the above remarks apply to the question of iron *vs.* steel in the construction of ships. No novel experiments are needed to show that if a ship is bumped against a rock, a soft iron plate capable of considerable indentation is incomparably safer than one of brittle steel.

Some experiments were made on the Nettle target ship at Portsmouth, on the 18th of December last, which are very instructive. The complex and difficult process of building huge armor plates of 20 or 30 tons weight by welding together four or five hundred or more puddled balls, naturally suggests the substitution of a material which, besides being harder and apparently stronger, may be manipulated so much more readily. With an easily attainable modification of existing appliances, the material for such a plate may be cast in a single ingot of steel and rolled at once into shape. Many attempts have accordingly been made to substitute steel armor plates for iron. The plates have been made, and, so far as hardness and tenacity, tested by steady strain, are concerned, they have been proved to be far superior to the armor plates that now clothe our great ironclads. When subject to a test resembling that applied to the bolts—*i. e.*, when exposed to the crushing blow effected by the point-blank battering of heavy ordnance—they have displayed great powers of resistance to the direct penetration of the shot, excelling the iron plates very decidedly in this respect, but at the same time revealing a far more dangerous weakness—that of cracking, splitting and even breaking up into a wreck of fragments.

The trials of the 18th of December were upon plates specially constructed with the object of overcoming this defect and yet retaining the unquestionable advantage of steely hardness. Messrs. Cammel & Co., of Sheffield, sent three plates: No. 1, a solid plate of very mild steel, the carbon kept as low as practicable, and treated in its manufacture with the special object of toughening or reducing the liability to crack or "star." Its dimensions were 9 feet 9 inches by 7 feet 9 inches and 9 inches thick; it weighed 12 tons 3 cwt. No. 2 was a compound plate; total thickness, 9 inches; 5 inches of hard steel in front, welded by a patented process to a backing of 4 inches of soft iron. It was supposed that the hardness of the steel front would resist the first impact of the shot and probably break it up, while the iron backing would arrest the cracks or starring of the steel and prevent their extension throughout the whole thickness of the armor, the vessel, consequently, remaining water-tight and the plates still standing to receive other shots. This plate measured 9 feet 9 inches by 7 feet 1½ inch, and weighed 11 tons 4 cwt. No. 3 was a sandwich plate, made up of a layer of steel between two of iron; the middle steel layer 6¾ inches thick, the front iron layer ¾ inch and the back iron layer 1¾ inch. It measured 8 feet by 5 feet 11 inches, and weighed about 7 tons 16 cwt.

Competing with these was a curious complication sent by Joseph Whitworth—a plate first made up bodily of Whitworth's fluid press steel of low carbon. This plate was then drilled through at certain uniform distances with holes 4¾ inches in diameter, and into each of these holes a hardened steel plug was screwed. Like the others, its thickness was 9 inches, its other dimensions 6 feet 8½ inches by 4 feet 11½ inches. These three plates, duly attached to the shield representing a ship's side, were attacked by Palliser shots weighing about 250 lbs., fired from a 12-ton Woolwich gun charged with 50 lbs. of pebble power.

The Whitworth plate came to grief rather speedily. I am not at all surprised at this, and am very much surprised that such a thing should ever have been constructed. In excuse for its failure, the *Times* newspaper pleads that it had not been "oil hardened" as intended. I am quite unable to understand how oil hardening or oil toughening could improve such a heterogenous mass. If the high carbon steel pins were fully hardened before insertion, a milder hardening by oil would diminish their size without equally diminishing that of the mild steel body of the plate. If soft when screwed in, the oil hardening would expand them considerably. In the first case the resisting power of the plate would probably be diminished by the aid of the series of skillfully initiated fractures, as a vibratory jar or sharply localized shock would occur when the vibration caused by the shot reached the lightly touching surfaces between the plate and pin. In the second case the expansion of the pins would subject the whole plate to a state of strain or tension at every hole, the force of which would come in aid of just the sort of rupture to be avoided, viz., a cracking across from hole to hole and consequent detachment of the intervening piece.

The composite plates, Nos. 2 and 3, both split up badly, "their complete disintegration being effected at the third shot." The only one of the four that stood the ordeal at all satisfactorily was No. 1, the homogeneous soft steel plate. This showed only a few indentations and hair cracks, with some bending inward. Like all the steel plates that have been hitherto tested, it resisted penetration better than wrought iron, but was weak in reference to cracking.

A shot may penetrate a good soft iron plate, leaving a hole not quite as large as the shot. If there is no cracking, the mischief ends there—the pierced plate still stands as at first for other shots; but a plate fractured even by hair cracks grows worse at every succeeding shot, and finally breaks to pieces.

The practical conclusion to which all the above-stated facts and reflections point is, I think, that for all purposes where resistance to vibratory shocks or suddenly applied strains of any kind is demanded, the old-fashioned wrought iron is more reliable than steel of any kind that is at present obtainable. I do not, however, maintain that we should be satisfied with this conclusion, but on the contrary regard it as indicating the direction of future effort, which should be devoted to the softening and toughening of these new steels in order to combine, as far as possible, some of their valuable properties with those of wrought iron.

This opens the interesting subject of annealing, which will be considered in a future paper.—*The Metallurgical Review.*

The Utica *Republican* talks thus about postal absurdities: There are some very queer things about our post office regulations. Take the postal card, for instance. If a man has a steady hand and writes close, he may put several hundred words on a card and send it for a cent. If he pastes the least strip of printed matter on it the postage is increased to 6 cents, though he may print on it the same matter, and by putting it in fine type get several thousand words on the card, and it will go for 1 cent; and he may paste the card all over with printed matter, then put it in an open envelope, and it will go for 1 cent. The card and envelope will go for less money than the card alone. When will these absurdities and inconsistencies be abolished and everything go by weight at a uniform price?

If iron or steel articles be boiled in the following mixture they will take a fine blue tint. Dissolve 4 oz. hyposulphite of soda in 1½ pint of water, and then add a solution of 1 oz. acetate of lead in 1 oz. of water.

A Great Trading Corporation.

The British *Trade Journal* gives the following historical sketch of the iron firm of Bolckow, Vaughan & Co., which is quite the largest trading corporation in the North-east of England. Commenced in a humble way by two persons, it has grown with the years, and laid the foundation of prosperous towns, developed important trades, and has become in these industries almost supreme in its own district. Fifty years ago a German, a native of Sulten, in Mecklenberg, left his fatherland and settled in Newcastle-on-Tyne, where he made the aquaintance of the manager of an iron works at Walker-on-Tyne. The two decided to enter into a partnership with the view to the erection of iron works, Bolckow the German finding the capital and his friend Vaughan the practical knowledge. After much inquiry a site was chosen on the banks of the river Tees, at the then young town of Middlesbrough—a town founded for the purposes of coal shipment by the promoters of the first English railway. Here, in 1841, the firm of Bolckow & Vaughan erected a small rolling mill, which with its adjuncts formed the first iron works in Cleveland. It shared the varying fortunes of the iron trade for a few years, and in 1846 the firm added to it a smelting plant, by the erection of four blast furnaces at Witton Park, near Bishop Auckland, where coal was plentiful, and where the owners expected to meet with ironstone in the coal measures. Iron, however, was not met with in sufficient quantities, and in quest of this food for their furnaces the firm had recourse to the then young iron mining district which had been developed by the opening of the railway between Pickering and Whitby. The want of iron nearer the mines was felt, and though the presence of large deposits of iron in the north of Cleveland was known, no commercial use was made of the knowledge until the firm of Bolckow & Vaughan became the pioneers. Collecting beach ironstone they used it in addition to that from Whitby; they leased some small mines on the coast, and prosecuted a vigorous search for the main seam of ironstone, which in the middle of 1850 was found, "a solid rock, lying 16 feet thick." Having discovered what was needed—an abundant, cheap and near bed of iron—the early difficulties of the firm were overcome, and from that time to the present its course has been one of almost uninterrupted progress.

Before the end of the year 1850 there had been arrangements made for the working of the mines, and 4000 tons of ironstone had been sent out, and for years the output was one of continual growth; and it is probably within the mark to say that from the Eston mines there have been extracted since their opening the enormous amount of 6,000,000 tons of ironstone. An almost incredible development of trade followed that discovery, carried out as it was by arrangements for mining operations at various parts of the vast fields of ironstone thus brought into requisition. The town of Middlesbrough commenced to grow rapidly, the hamlets near the mines became populous villages, labor flocked into the district, and its development for mining enterprise became a question merely of time. One by one mines have been opened out, until the district has become by far the most productive of iron-raising centers in the world, and its output now is between 6,000,000 and 7,000,000 tons yearly. Set by set blast furnaces have been erected, until where in the whole of the North there were 30 furnaces, there are now 164, each larger and much more prolific, as well as much more costly. And of the finished iron industries, as well as of other allied works, there has been at least an equal construction.

To that vast industrial growth the pioneer establishment has contributed its full share; and when a dozen years ago the firm was merged into a limited company its dimensions had become colossal. It had then blast furnaces at three centers in Cleveland and South Durham, with contributory iron mines among the largest known, as well as 100,000 tons of finished iron and castings, and other work proportionately. It raised then a million tons of coal yearly, three-quarters of a million tons of ironstone, and over 150,000 tons of limestone. It owned hematite iron mines in Spain, farmed thousands of acres of its own land, kept a fleet of steamers, owned and worked 30 or 40 miles of railway, and possessed a rolling stock for minerals such as many railways might envy. At the mines, the works, the coke ovens, limestone quarries and other establishments about 10,000 workmen were employed. Since that time there has been a growth in many departments of this gigantic trading corporation, and it has entered into the business of steel manufacture, having erected large mills and works. It now employs 12,000 operatives and pays £1,000,000 yearly in wages, and its subscribed capital is £3,650,000. It has 20 blast furnaces—a huge smelting plant, in which £400,000 must have been sunk; its steel mills have turned out steel rails at the rate of over 60,000 tons yearly; its coal mines have a capacity of production of probably close upon 2,000,000 tons yearly, and its mining operations in Cleveland, South Durham and Spain are on a scale of unexampled magnitude. Its predecessors introduced the iron trade into Cleveland, applied the discoveries of the Cleveland ironstone, and commenced the smelting operations which are now on a larger scale than in any other district; and now it has introduced on a scale of magnitude the steel manufacture into the same district. With works extending over many acres, with mines under many miles, and with an income exceeding that of many States, the great company of metallurgists is one of the proofs of the soundness of the Northern trade from which it springs, and it is a monument to the energy, the indomitable perserverance and the business capacity of its founders. Bringing its ore to the surface at its mines, bringing also its coal and limestone similarly to the smelting-place in its own furnaces, and carrying it in all processes only through its own works, it turns it out in the shape of finished iron or steel, and placing the product, possibly, in its own steamers, it is perhaps the most complete of the many industrial establishments of which the North country may be proud.

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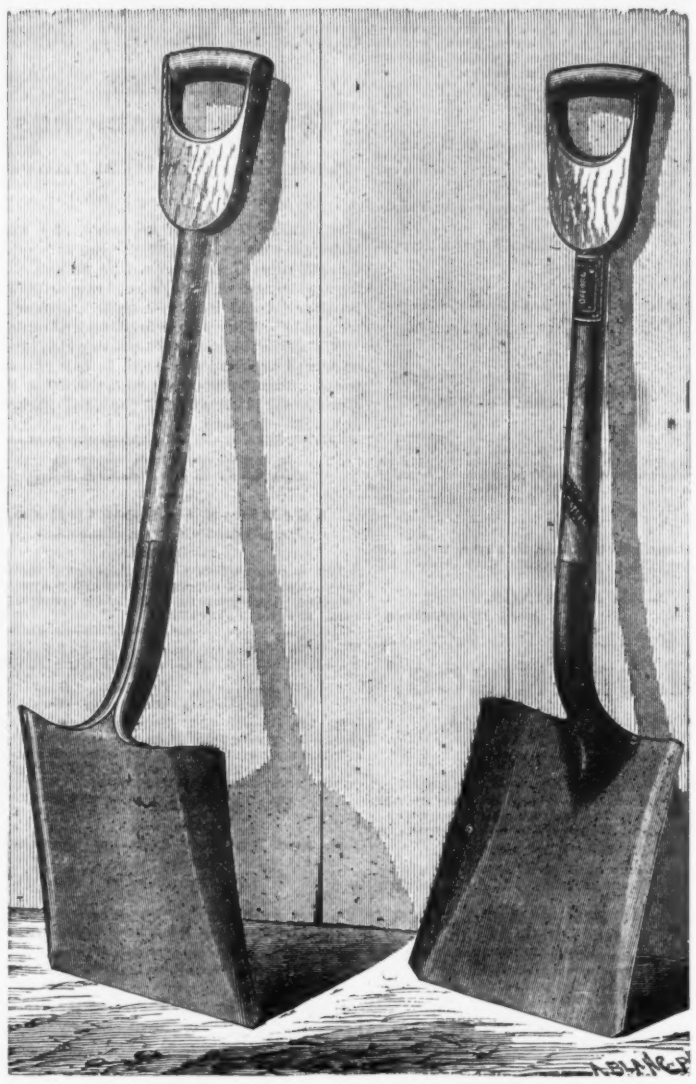

THE
OXFORD PATENT WELDED
Solid Cast Steel Shovel.
OIL TEMPERED.

The Oxford Patent Welded Solid Cast Steel Shovel, as now furnished by us, is a new article of manufacture, of a single plate of Cast Steel, without rivets, welded by the Antrim process, with smooth surfaces front and back, and with socket continued some distance up the handle, completely encircling it in the manner of a ferrule, thus insuring a perfectly straight handle in every instance, and securing the qualities of absolute perfection of strength, and the greatest beauty of construction possible. Taken altogether, our methods will be found to obviate all the defects now so patent in all other Shovels, even those of first-class manufacture, and we will guarantee for them superior strength in parts usually the weakest, perfect symmetry and regularity of appearance, and wearing quality one-third greater than those of any other now made.

The same will apply to our Oxford Patent Welded Solid Cast Steel Spade, Long Handle Round Point Shovel and D Handle **Moulder Shovels** in every respect.

OXFORD
Warranted Cast Steel.

Goods of this stamp are made of the very best material, and are warranted. We will always replace them with new ones in every case where reasonable satisfaction is not given.

B. ROWLAND & CO.,
CITY OFFICE,
27 North Fifth Street, Philadelphia, U. S. A.
Works at Frankford, Phila., U. S. A.

NEW YORK WAREHOUSE, 100 Chambers St.

INDUSTRIAL ITEMS.

NEW YORK.

The car shops of the Corning, Cawanesque and Antrim Railroad, at Corning, were burned Monday morning, the 20th inst. The loss is $30,000; insurance, $25,000.

The Walter A. Wood Mowing and Reaping Machine Works at Hoosick Falls are doing an enormous amount of manufacturing at the present time. The buildings have been recently enlarged to a material degree, but more structures are necessary, and additional land has been purchased on which to place manufactories. The number of employees since last winter has been increased from 1000 to 1400, and a large force is kept busy day and night. The pay roll averages about $60,000 per month, which makes a valuable consideration to the tradesmen and merchants of that place. The magnitude of these works may be estimated when it is stated that a complete mower or reaper is turned out every four minutes, or at the rate of 176 per diem. Even at this surprising rapidity the orders for machines greatly exceed the capacity of the works, and it is alleged that the number manufactured will be 2000 less than the demand calls for prior to the close of harvest.

MASSACHUSETTS.

The great suit of the Lenox Plate Glass Co., of Pittsfield, against Wm. E. Dodge, of New York, to recover damages of $600,000, was begun in the Supreme Court on Tuesday morning, the 21st inst. The plaintiff claims that in 1870 Dodge and others were interested in a concern in Philadelphia making white glass from cryolite, while the plate glass company was making plate glass in a Lenox furnace; that Dodge induced the glass company to undertake the manufacture of this white glass from cryolite, representing that it was very profitable; that the glass company invested in the company and was ruined; that it was subsequently discovered that while Dodge had been making representations of large profits his concern was in fact bankrupt; that Dodge was personally liable for the enormous amount of its debts, and made these representations to the glass company to relieve himself from this load. The defense is a general denial.

CONNECTICUT.

Coulter and McKenzie, manufacturers of light and heavy machinery, have moved their factory from 19 Water street, Bridgeport, to the premises of the Bridgeport Iron Works.

About 700 employees at the Bridgeport cartridge shop have been dismissed because the supply of cartridges for the Turks has been diminished.

The Meriden Silver Plate Company have made considerable additions to their works the past year by the erection of new and commodious plating rooms. Special attention has been given to thorough ventilation, and the rooms are kept constantly free from injurious gases. Their plating is done by a Weston dynamo-electric machine. An elevator runs from this department to the warerooms, where goods are selected and pass to be plated, subsequent to order, and immediately before shipment. The capacity of the Weston machine is such as enables them to plate large quantities of goods in a brief space of time, and the goods can therefore be shipped fresh plated. An object of interest in this establishment is one of John Roberts & Co.'s hydraulic presses of 500 tons capacity, which, to perfectly imprint the dies of some designs upon the metal, requires almost the entire capacity.

The Meriden Britannia Company report business considerably improved, and are running with the usual force. A good reputation for their products has long been established.

P. & F. Corbin, New Britain, manufacturers of builders' hardware and bronze trimmings, have just completed the trimmings for the new capitol at Hartford. Their works are pretty fully employed, and many new and desirable patterns are being made. A new feature is the manufacture of bit braces.

A recent transfer of property, which bids fair to establish permanently in this country an industry which was formerly unable to meet foreign competition successfully, is the purchase of the entire establishment of the Maltby, Hopson & Brooks Co., of Waterbury, Conn., by Messrs. Miller, Metcalf & Parkin, of Pittsburgh, Pa., and its removal to the latter city. The main difficulty in making steel drill rods, needle wire, &c., the Maltby, Hopson & Brooks Co. found to be obtaining from English steel importers steel rods of uniformly satisfactory quality. The success obtained by Messrs. Miller, Metcalf & Parkin in producing fine steels, cold as well as hot-rolled, is a guarantee for the successful establishment of the new enterprise, aided as they are by the perfection and accuracy of the machinery acquired by their purchase.

PENNSYLVANIA.

Riehle Bros., Philadelphia, have just received an order from the Pennsylvania Railroad Co. for a 50-ton testing machine, and are at work upon one of 100 tons capacity for the Chicago, Burlington and Quincy Railroad Co.

The new rail mill of the Cambria Iron Works, at Johnstown, has resumed double turn again, and an additional number of workmen have thus been furnished with employment.

The ore and paint mines of D. B. Fisher, at Leesport, are again in operation.

A. & P. Roberts, of the Pencoyd Iron Works, Philadelphia, are making the axles for 400 freight cars now building at the Harrisburg Car Works.

A new brass foundry is being erected in New Castle.

The Croton Glass Works, of New Castle, are in operation, giving employment to 80 persons.

The Sharon *Herald* says: W. A. Burbank, stove manufacturer, Newton Falls, has made an assignment for the benefit of his creditors.

It is thought that both the furnaces at Brier Hill will be in blast within 60 days.

It is reported that one of the furnaces at Mineral Ridge will be blown in by Jonathan Warner.

The charcoal furnace of Spang, Erb & Co., at Lenhartsville, has been overhauled completely; a new coal house has been built, and a hearth erected. The furnace will be put in blast on Tuesday or Thursday of next week. The best charcoal car wheel iron is manufactured.

The Northampton Furnace, at Shimersville, opposite Freemansburg, was started up Thursday morning last. The furnace is run by the Bethlehem Iron Company.

The following interesting information in regard to the Moselem Furnace is taken from the Reading *Times and Dispatch:* At Moselem is located the Moselem Furnace, established many years ago, and for a long period operated by Messrs. F. S. Hunter & Bro. Upon the death of the senior member of the firm, the late lamented Frederick S. Hunter, the business was conducted for several years by the surviving partner, Nicholas Hunter, who, in the spring of 1871 failed with liabilities including the partnership of E. Hanford & Co., of New York, amounting to over $1,000,000. This is the heaviest failure of a single individual ever recorded in Berks county. The Moselem Iron Company were the successors in the management of the Moselem furnace and mines, which corporation having been sold out at Sheriff's sale a little more than a year ago, have been succeeded by Messrs. Leybrant & McDowell, a wealthy firm of Philadelphia, extensive manufacturers of stoves, heaters, and ranges. The Moselem furnace, which is one of the best equipped and most conveniently arranged in the State, is undergoing important alterations and repairs, for the purpose of increasing its capacity by the introduction of P. L. Weimer's latest improvements. The shape of the stack is being changed by an enlargment of the same above and below the boshes, whereby it is expected that the capacity of the furnace will be increased to 185 to 200 tons of first-class iron per week. The weekly production of iron heretofore averaged 115 tons. To admit of these changes the stock house is being extended and deepened, and other important alterations are being made. The success of Mr. Weimer's furnace improvements is leading to their adoption by a number of furnaces in Eastern Pennsylvania. One of the best examples of Mr. Weimer's success is the furnace of the Warwick Iron Company at Pottstown, which heretofore was constantly chilling; whereas since the adoption of the Weimer improvement the furnace works admirably, and its capacity is now larger than that of any other in the Schuylkill valley, being over 300 tons per week. The Moselem furnace improvements, it is expected, will be completed by the first of July, when the furnace will again be put in blast.

We clip the following from the Sharon *Herald* of the 24th inst. for the week ending Saturday May 18th. At the Westerman Iron Works, puddle, guide and hoop mills, double turn; bar and sheet mills, single turn; nail factory and nail plate mill, off. Both blast furnaces still keeping up their good name. No. 2 almost turned her thirty-sixth month, and seemed good for 36 more. At the new mill, puddle, guide and one hoop mill, double turn; new hoop mill, off; bar mill, single turn; nail factory on all week. Keel Ridge Furnace working steadily. Stewart Furnace No. 1 got the blast on early on Tuesday morning, the 14th inst., moved off right nicely, doing as well as could be expected for a newly-blown-in furnace. By the last of the week it had worked up to 40 tons a day, Bessemer. Workmen are engaged in tearing out No. 2.

The work of enlarging the shaft on the Gabel iron mine, at Boyertown, has been progressing for some time, and is now completed to the depth of the original mine, about 53 feet. The enlargement is 12 by 14 feet. The mine is worked by the Warwick Iron Company of Pottstown.

The new Douglassville forge is now in active operation. On Wednesday, the 22d inst., the first blooms were made to be shipped to Conshohocken. The forge employs 12 furnacemen, besides engineers and laboring men.

The Philadelphia Screw Company are running their works to their fullest capacity, while orders are being received which indicate an active summer's business.

Selden G. North of Philadelphia is the patentee of "North's Universal Lathe Dog," which seems to be in increasing demand abroad. Shipments have recently been made in response to orders from London, Paris, Hamburg and Australia.

PITTSBURGH AND VICINITY.

The case of the American Saw Company *vs.* James E. Emmerson, of Beaver Falls, was concluded in the United States Circuit Court last week. It seems the defendant was patentee of a saw and sold his right, with an alleged reservation of a right to manufacture himself. On the testimony, the court decided that Emmerson had no reserved right. The case is important, as it covers 11 years of manufacturing. Mr. Van Dorn, of New York, appeared for complainants, and Mr. Emmerson managed his own case. A final decree was made, sustaining the plaintiff, and an injunction ordered to restrain Emmerson from making the saw.

The Lippincott Ax Factory, Pittsburgh, is on full in all its departments.

Moorhead & Co.'s mill, this city, is running full time and with good prospects.

On the 16th inst. Wm. Miller, of Duquesne Forge, completed a Bessemer steel shaft for a steamboat, on the order of Dumont of Cincinnati. The shaft is hexagonal, 21 feet long and 6 inches in diameter, and is the first steel shaft for a steamboat ever forged in Pittsburgh. The steel was made at the Edgar Thomson Steel Works.

The blast furnace of the Clinton Iron Works is shut down for the first time since 1860, except an occasional stoppage for repairs. The reason given by the firm is that they can buy pig iron for less than they can make it. While the situation is favorable for buyers' interests it is hard on a large number of workmen, who must seek employment elsewhere for a time. The firm have 3000 tons of pig iron on hand, and as the rolling mill is only running single turn this amount will last 4 or 5 months. Should orders come in heavily it may be the furnace will start again, but it seems the company are not disposed to push business.

Messrs. Bryce, Walker & Co., started up their glass works on the south side last Monday.

Messrs. Samuel McKnight and John Sed-

den have found a co-partnership under the style of McKnight and Sedden, at 61 Federal street, Allegheny city, one square below the West Pennsylvania and Fort Wayne Railroad depots. They will do a general hardware and cutlery business, and they have a very fine stock of goods on hand.

MARYLAND.

Watson's steam forge and iron car-axle factory, at Locust Point, was burned Monday morning, the 20th. Loss $25,000; insurance over 50 per cent.

OHIO.

The Lawrence Iron Works, at Ironton, made an assignment to Evan F. Williams, on Tuesday, the 21st inst. They have not yet made a statement, for they resorted to this movement somewhat suddenly, as they expected to effect such an understanding as to enable them to continue business, but some suits having been brought against them, they concluded to take a course that would be impartial. The general depression of the iron business for the last three years has inflicted loss upon their operations, but even this they could hold up under still longer had not the bottom been knocked out of the credit of the iron business. Since the failure of Etna, it has been exceedingly difficult to use the commercial paper of iron establishments unless secured by outside credit. At least such is the case in Cincinnati and southern Ohio. And this is the state of affairs in which the Lawrence mill is struggling. The assets of the firm largely exceed the liabilities, and it is possible that the necessary extensions may be obtained.—*Ironton Register.*

Tod furnace now under the efficient management of J. G. Butler, Jr., will blow in early next week.

The Portsmouth *Tribune* say: The Charcoal Iron Company, viz., Buckhorn and Howard furnaces, have asked an extension of their creditors. Their assets largely exceed their liabilites. Messrs. Campbell and Chas. L. Nevins are arranging the affairs of the company, and they will soon be able to pay all they owe.

The Cleveland Rolling Mill Company paid out about $130,000 for labor on May 13th.

It is reported that a glass works will be built at Massillon at an early date.

The edge tool works of Leetonia are in full blast.

The White Sewing Machine Company are about to erect additions to their works on Canal street, Cleveland.

The average for 12 consecutive days of 9 hours' work at the new rod mill of the Cleveland Rolling Mill Company on No. 4 rods was 42,050 lbs., or a little over 21 tons.

Belfont Furnace, Ironton, shut down work early last week after a successful 10 months' run. The furnace is said to have averaged over 1000 tons per month, and did it on less than 50 bushels fuel per ton of pig. The fuel was about four-fifths ocke and one-fifth coal.

Turner, Parks & Co., Cuyahoga Falls, are putting up a building for storage.

The Burgess Steel and Iron Works, at Portsmouth, have recently erected a new steam hammer, to be used exclusively for hammering steel bars. It seems that they have two other hammers for the same purpose, one being a much heavier one, making about 250 "tilts" per minute, and a smaller one, making 350 to the minute. The advantage of the new one is that it is very much heavier than the small one, but with the same amount of steam will make as many "tilts" per minute, thus doing effective work in a rapid manner and at the same cost of a small hammer.

The Glasgow and Port Washington Iron and Coal Company, of Tuscarawas county, have recently discovered a bed of iron ore—a blue carbonite—and a bed of limestone on their property at Port Washington.

G. M. Heard & Co., Cleveland, manufacturers of fine silver and gold plated coach and saddlery hardware, and general gold, silver and nickel platers, are crowded with work. They make a specialty of coach and and saddlery hardware, door and number plates, and have gained a reputation for doing first-class work only.

The annual meeting of the Cleveland Iron Mining Company was held at the office of the company on the 15th inst. The following gentlemen were elected directors for the ensuing year: Samuel L. Mather, Selah Chamberlain, J. H. Wade, James Barnett, T. P. Handy, W. J. Gordon, Isaac N. Judson, of New York, and M. L. Hewitt, of Marquette. Samuel L. Mather was elected president and treasurer, and Fred A. Morse, secretary.

Fifty new box cars are building for the Cleveland and Pittsburgh road at the Cleveland shops.

ILLINOIS.

Bonnett, Duff & Co., Quincy, have run 15 weeks without losing a heat, and put 16 full cars of stoves into the State of Kansas.

MICHIGAN.

The following, compiled from the Marquette *Mining Journal*, is an exhibit of the shipments of iron ore from the Lake Superior district for the season up to and including Wednesday, May 15:

FROM MARQUETTE.

Name of Mine.	Gross tons.
Rolling Mill	797
Lake Superior	10,685
Edwards	661
Republic	18,269
Champion	7,322
Cleveland	6,646
McComber	856
Humboldt	1,836
Winthrop	766
Total	47,878
Pig Iron.	
Carp River Furnace	488
Pioneer Furnace	119
Total	608
FROM L'ANSE.	
Michigamme	2,542

J. D. Miller has leased the stove department of the agricultural works, at Wyandotte, and proposes to run it on his own responsibility.

Production of Phosphate Rock in South Carolina.—The mining and manufacturing of the phosphate rock in South Carolina has become one of the leading and most important interests of the State. From small beginnings the shipment and manufacture has risen in nine years to the large amount of 199,086 tons in 1877-'78, of which 115,965 were shipped to foreign ports, 64,486 tons coastwise, and 16,635 tons were consumed by home manufacturers.

Foreign Competition in the English Iron and Hardware Trade.

The *Ironmongers' Review* says: In these days, when foreign competition is menacing so many of our manufacturers with keener competition than has yet been experienced, it may interest our readers to know to what extent this danger has already grown.

Let us first turn to the Belgian iron manufacturers. Here we find that the item of iron beams or girders, now so frequently employed (whether rightly or not is not now within our province). These can be delivered at a price which enables the makers to compete strongly with our home manufacturers, while the quality remains all that can be desired. One drawback against the use of these beams is the fact that none of the foreign firms hold stock in this country. Train and colliery rails are also supplied at a considerably less price than the same can be purchased at either in South Wales, Cleveland or Staffordshire, and we are informed that in all probability several considerable contracts will be lost to our manufacturers on account of their inability to reduce their prices to the same basis as those of their foreign opponents, and this, it must be understood, can be maintained, notwithstanding that the Belgian makers have a heavy carriage to pay, far more than any of our own firms are burdened with.

Nails are also important items, and here we come to an opportunity for some of our enterprising friends to introduce an article which is gradually coming into favor with our carpenters and joiners—we speak of the wire nails. These nails, against which for many years there has been a great prejudice among artificers generally, are slowly but steadily making headway, and considering the many advantages which they possess over the ordinary cut nails, we think it will not be long before they are in universal demand. They drive much easier, there are many more nails to the hundredweight of the same strength than in the cut nails, there is no waste, and if necessary they can be clenched without any fear of breakage. In hob and boot nails and rivets a great advantage is seen both as regards finish and price.

Bolts and nuts for carriage and coach builders, colliery purposes, and for all ordinary use can be supplied from Germany and Belgium at prices against which our manufacturers find it difficult to compete, while tinmen's and other rivets can be obtained at rates which surprise our English makers.

On the 1st instant a new monthly Brazilian paper was started in this city—the *Correspondencia dos Estados*—partly political and partly commercial, edited by Messrs. H. de Aquino and Mello, for many years past identified with Brazilian interests in this city. The paper is printed in the Portuguese language, and as it is conducted by men of experience, it will be an important addition to the list of periodicals printed here in foreign languages.

Special Notices.

SPECIAL NOTICE.

The undersigned offer their services as agents to

American Producers of Metals.

They represent foreign brands of

Zinc, Russia Iron, Hoop Iron, Window Glass, Cutlery and Guns.

LOUIS WINDMULLER & ROELKER,
20 Reade Street, N. Y.

Wanted—A Partner,

In a foundry and machine business, already well established. Locality splendid and healthy.

A practical man with means is wanted to join a practical man who is already well established.

Address ***CAR WHEEL FOUNDRY,***
P. O. Box 134, Selma, Alabama.

For Sale,

New and Complete STOVE FOUNDRY

AT

Lawrenceburgh, Dearborn Co., Ind.

(20 miles from Cincinnati, Ohio.)

This foundry is situated about one hundred yards from the Ohio River, at the junction of the Ohio and Miss. and Cin., Ind. and Lafayette railways. It was *finished* and *commenced running* about *three months ago.* It is one of the most *complete* and *substantial* factories of the kind in the West, and can be put into active operation in one day, everything necessary being on the premises, including Flasks, Patterns, &c.

I solicit and will receive proposals for the purchase of same until the 1st day of June next.

JOHN D. ABRAHAM, Assignee
of Samuel L. Yourtee & Co.

CINCINNATI, May 14, 1878.

Splendid Chance for Investment.

Stove and House Furnishing Business FOR SALE,

doing a large trade, established ten years, very best location in one of the largest cities of Michigan. Stock in excellent condition. No better chance for a good investment in this line in the whole country. Poor health of owner reason for selling. Address

GEO. H. BARBOUR,
Secretary Michigan Stove Company,
Detroit, Mich.

For Sale,

A well-selected stock of Hardware, in one of the most thriving county seats in Ohio. Stock all *first class*, and in splendid order. Stock not large, but very complete. This is a rare opportunity. Terms easy. For particulars, &c., address A. B.,
No. 439 Superior St., CLEVELAND, OHIO.

WANTED.—A SITUATION BY AN EXPERIENCED Hardware Salesman who has traveled ten years in New England. Good references
Address **J. H.,**
Office of *The Iron Age*, 83 Reade St., New York

WANTED.—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desires a responsible position. References satisfactory. Address,
IRON AND STEEL,
Care of ***P. O. Box 813, Bridgeport, Conn.***

Special Notices.

JENNINGS'S

COMBINATION DISCOUNT TABLES.

(Published by the author.)

This Book contains 1500 tables for single and combination discounts, such as 17½%, 45%, 10&7½%, 15&5%, 25&10%, 33⅓&5&2%, 35&7½&2%, 45&5&10%, 50&10&5&10%, 65&5&10&2%, 65&10&10%, 75&15%, &c., &c., which are so arranged as to be found without loss of time, and by their use either the **Discount** or **Net** on any amount of dollars and cents, from a penny to one million dollars, can be ascertained in a few seconds entirely by **Addition.** Just the thing for **making** or **proving invoices,** finding **Net Value** of goods bought or sold, and comparing different Discounts, thereby saving time, blunders and **scratwork.**

(*A copy can be examined in "The Iron Age" Exhibit at the Paris Exposition*).

OPINIONS.

TOLEDO, O., April 15, 1878.

Mr. S. H. Jennings: DEAR SIR.—Your Discount Tables are received, and I think are all you claim for them, and that they will be appreciated by the trade. I have had inquiries from customers for something of the kind, and shall be pleased hereafter to recommend your book. Yours, very truly,
T. W. ROOT,
with The Russell & Erwin Mfg. Co.

MILLDALE, CONN., March 20, 1878.

We consider it a great help, and a book which every business house should possess.
CLARK BROS. & Co.

HOUSTON, TEXAS, April 8, 1878.

We find it saves a great deal of figuring.
DECHAUMES & DUNN.

HOT SPRINGS, ARK., April 10, 1878.

We find the Tables correct, and are highly pleased with it. Every merchant should have one of them.
FONES BROS. & CO.,
Hardware Merchants.

It will be mailed, postpaid, to any address, on receipt of the price, $3. Currency may be sent by **mail** at my risk. Address

S. H. JENNINGS,
Deep River, Conn.

S. H. JENNINGS,

Deep River, Conn., U. S. A.,

Offers his services to parties in any

FOREIGN COUNTRY

except Great Britain, who may desire to establish, build up, or increase a trade in **American Hardware, Agricultural Implements, Machinery,** and **Miscellaneous Goods,** as

EXPORT FACTOR,

at a low rate of commission. Correspondence solicited. He has had three years' experience as Purchasing Agent for

Messrs. WM. MARPLES & SONS,
Sheffield and *London, England,*

Jobbers doing business throughout Great Britain, and to whom he would with pleasure refer. By arrangement with them he will represent no other firm having a house or branch house in Great Britain, which includes England, Ireland, Scotland and Wales. He buys direct from **manufacturers,** and only for **export,** thus securing lowest possible prices. He will attend to all matters this side of the water, including Purchases, Shipments, Remittances, &c., and has facilities in New York City for securing prompt shipments at most favorable rates of freight. Manufacturers of goods suitable for Foreign Trade are invited to send in their circulars or catalogues, and quote "hard pan" prices for export, which will be considered confidential.

Second-Hand Tools and Engines.

One 14 in.x30 in. Adjustable Cut-off Engine, wheel 10 ft. diam., 20 in. face; one Horizontal Tubular Boiler, 54 in. diam.x16 ft., has 60 tubes 3 in. diam., full fronts; one 22 in. Double Belt, 68 ft. long. Above in first-class order, and will be sold cheap if purchased before removal; price $2600.

One 26 in. swing x 17½ ft. bed Engine Lathe, back geared, screw cutting, rod feed, compound rest, power cross feed, steady rest 24 in. chuck, and 3 tool rest for shafting. In first-class condition, price, $400.

E. P. BULLARD,
Successor to BULLARD MACHINE CO., Limited,
14 Dey St., New York.

For Sale, To Let or Exchange

For other Property (Western preferred), Stock or Interest in an established Business,

On very reasonable terms, one of the finest pieces of property in the country for Foundry or general Manufacturing purposes, and consists of the following substantial brick buildings, situated corner Vail Ave. and North St., Troy, N. Y., viz., Moulding room, 132x74 ft., with large three-story building attached, 174x52 ft. The distance between floors and ceilings on each story is respectively 14, 12 and 10 ft., and are now used as mounting, store, sample and office rooms. Attached also is a two-story building, 90x45 ft., with engine and boiler rooms. On same grounds are sheds, barns and large yard. Attached to the property also are engine and boiler, main lines of shafting, elevators, &c. The property fronts on three streets. It will be sold, rented or exchanged, in part or together, and at very low price. Address

A. G. PATTON,
Columbus, O.
Or W. H. HOLLISTER, JR., Troy, N. Y.

Seldom Offered.

A chance to take an active interest in one of the largest and most successful steel works in this country. One strictly first-class business man to take charge of the finances, &c.; also one or two young men to assist in the general management of works, business, &c. To parties having means and ability, and who wish to engage in the manufacture of crucible and Siemens-Martin steel, no more desirable opening can be found.

All communications strictly confidential.

Address, *"VERITAS,"*
Office of *The Iron Age*, 83 Reade St., N. Y.

An Established House

Would like to have the agency for Spain of some American manufactories, with the view of introducing in that country American wares. Principals only need apply to **J. M.,**
No. 3984 P. O. B., New York City.
Satisfactory references must be exchanged.

Special Notices.

W. GARNER,

General Merchant,

Mouldsworth, near Chester, England,

Supplies nearly every class of Goods,

including all kinds of

Agricultural Machinery, Domestic Machines,

SEWING MACHINES

And Artificial Manures.

W. GARNER is open to represent any Foreign Manufacturers in England for the sale of their manufactures of whatever nature or kind. Having a wide and well established connection in the Provinces, could introduce some American, German and French products to mutual advantage.

W. GARNER is also open to buy any kind of Goods on commission, and ship them to any part of the world. Manufacturers or others desiring his assistance will please address (with full particulars in English) as above.

AUSTRALIA.

AMERICAN HARDWARE CO.,
No. 9 WILLIAM STREET, MELBOURNE,
AUSTRALIA,

Solicit correspondence with American manufacturers desirous of representation in the Australian Colonies. Consignments will have prompt attention. References furnished.

To Manufacturers and Jobbers of Hardware, Cutlery, &c.

Manufacturers and Jobbers, having surplus stocks or goods that from any cause are unsaleable upon which they wish to realize, or assignees who have stocks to dispose of, will find a cash purchaser by communicating with.

W. M. CALDWELL,
Dealer in
Job and Auction Lots of Hardware, Cutlery, &c.,
102 Chambers St., New York.

DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of

Iron and Steel Drop Forgings

in quantities to order at reasonable rates.

HERMANN BOKER & CO., Proprietors,
101 & 103 Duane St., N. Y.

HALSEY & MILLET,

Auctioneers and Commission Merchants

112 Chambers St., New York,

Solicit from manufacturers, importers and jobbers consignments of Hardware, Cutlery, House Furnishing Goods, &c. &c., for their regular weekly sales.

JAMES E. HALSEY, formerly of J. E. Halsey & Co. CHAS. A. MILLET, formerly of Bissell, Welles & Millet.

For Sale.

Large Punch and Shears, N. Y. Steam Engine Co. make; two small Punches; 16x4½ feet Planer; number of Drills and a lot of tools suitable for architectural ironwork; Steam Engines and Boilers of all sizes at **JOHN CARROLL,**
266, 268 & 270 Front St., N. Y.

The Sherman Process Co.

9 Pemberton Square, Boston, Mass.,

Issue Licenses to use the Process for the Manufacture of Iron and Steel

In the Bessemer Converter, Crucible, Siemens-Martin, Puddling, Blast and Cupola Furnaces.

The use of this Process improves the quality of the product, saves fuel and labor, and does not require any change in furnace or manner of working. See page 17 of *The Iron Age* of Oct. 25th, 1877.

Price Book

for General Hardware.

Half leather, $10; full leather, $12. Send for descriptive circular.

In use in nearly every State in the Union, and growing in favor every day.

BUELL LAMBERSON, 97 Chambers St., N. Y.

Bissell & Welles,

Wholesale Hardware Auctioneers,

No. 15 Murray St., New York.

Sales held weekly for the trade. Consignments solicited. We refer to the leading Manufacturers and Importers.

SITUATION WANTED

As Manager of an Iron Foundry and Machine Shop.

Have had an experience of over 20 years in that capacity and am thoroughly familiar with all its details. Could control a large amount of work, and would make an engagement in return for an interest in the profits of new work that could be induced. Parties in want of an energetic, capable and valuable man for such a position can obtain an interview by addressing "MANAGER,"
Office of *The Iron Age*, 83 Reade St., New York.

PROPOSALS.

THE TRUSTEES OF THE NEW YORK AND BROOKLYN BRIDGE, Office, No. 21 Water Street, Brooklyn, May 24, 1878.—Sealed proposals will be received by the Trustees of the New York and Brooklyn Bridge at their office, 21 Water Street, Brooklyn, until 12 m. on the fifteenth (15th) day of June, 1878, for the manufacture and delivery—not including erection—of about five thousand eight hundred (5800) tons of wrought iron and steel work required for the suspended superstructure of the East River Bridge. Specifications may be obtained and plans seen at the Engineer's office. W. A. ROEBLING,
Chief Engineer.

Wanted,

in Boston, an active young man, with some years' experience in selling Builders' and General Hardware. A good salesman will find a permanent position at a moderate salary, subject to increase.

Address, with full name only,

Box 995, P. O., Boston.

NOW READY.

THE

Metallurgical Review

For June.

PUBLISHED MONTHLY BY

DAVID WILLIAMS

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DELICATE TEST FOR VAPORS OF MERCURY.

The June number of the *Metallurgical Review* contains a large number of articles by engineers and scientists pre-eminent in their specialties, and therefore the information, the suggestions and the criticisms on topics of far-reaching importance, will command the attention of practical metallurgists and prove of direct benefit to them.

The second part of "Copper Dressing in Lake Superior," by Prof. Egleston, gives a most detailed, accurate and discriminating description of the well-known Ball Stamp, with careful data as to the duration of its various parts, their weight and a summary of their cost. The work performed by the stamp at various mills is tabulated, thus permitting a very accurate estimation to be made of the amount of work it is able to perform. Among the illustrations are drawings of the details of the mortar which have until now been strictly withheld from the public.

The subject of Prof. W. Mattieu Williams' second contribution to the series, "Studies in Sheffield," is "Homogeneity and Annealing." The author, who is so thoroughly conversant with the important topics now agitating both engineers and metallurgists, makes some suggestions as to the means by which the great desideratum, a metal which shall combine the toughness of iron with the homogeneity of steel, may be attained.

Mr. Andrew A. Blair, chemist to the United States Board appointed to test Iron and Steel, gives a description of a method and an apparatus used by him in the "Determination of the Total Carbon in Iron and Steel." Both the method and the apparatus are the result of careful investigation, the methods used hitherto being found incapable of meeting the requirements of the Board—extreme accuracy, reasonable speed and no undue difficulty of manipulation. Chemists who are frequently called upon to make the determination of total carbon in iron and steel, will find the apparatus eminently adapted to the purpose, to which should be added that it possesses the advantage of being cheap.

The second installment of Mr. Alex. L. Holley's paper on the "Terrenoire Process of Making Solid Steel Castings," gives numerous illustrations of the practice taken from actual working charges made at Terrenoire, the exact amounts charged and time required, the nature of the tests being accurately detailed. The fact that the process has been introduced with conspicuous success in an American crucible works, proves the great importance of the subject to steel makers in this country.

Little attention has been given by American mining engineers to the intricate problems connected with the stamp mills. Some valuable information on the subject will be found in this month's installment of Mr. E. F. Althan's paper on the "Mechanical Dressing of Ores and Coal."

Copper extraction from poor ores by chlorination has been for many years one of the great industries connected with England's enormous alkali trade, poor cupriferous pyrites being roasted for the manufacture of sulphuric acid and then leached for copper. Although the process has been repeatedly described, its chemical features have never before been so clearly brought before the public as in the article now presented.

The abstract of M. Badoureau's excellent summary on the "Metallurgy of Nickel" is brought to a close in this number. Short notes on the "Manufacture of Coke from Anthracite Dust," by Jones Wister, and on the "Composition of Minnesota and Paschkoff Copper," by Dr. W. Hampe, add to our knowledge of subjects which well merit attention. Dr. Hampe's complete analysis of Minnesota copper is the first of its kind on record, proving by analysis what users of copper have long ago ascertained, that there is no copper in the market capable of rivaling the Lake Superior brands.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, May 29, 1878.

The past week has been characterized by an improvement in the general condition of the financial markets—partly because of increasing confidence in the stability of investment shares, and partly because of the improved prospects of peace in Europe. The money market is still very easy, the sales in call having declined to 2½ %.

The gold market has gained a temporary strength from the heavy demand for coin to meet the settlements for the 4½ % bonds. The following table shows the daily range of the premium since our last report:

	Highest.	Lowest.
Thursday	100⅞	100¾
Friday	101	100⅞
Saturday	101	100⅞
Monday	101	100⅞
Tuesday	101¼	100⅞
Wednesday	101⅛	101

The bond market has been strong, with a steady advance in prices. During the week the syndicate sold all the United States 4½ per cents they have for sale, although for reasons which concern the convenience of settlements with the Treasury, they have not taken the remaining $15,000,000. The delivery of these bonds to the persons, firms and banks that have bought them from the syndicate is therefore temporarily delayed. During the week $5,000,000 more 5-20 6 per cents were called in for redemption, out of the proceeds of the sales of United States 4 per cents by popular subscription.

State bonds are dull and steady; railroad bonds are buoyant on an active investment demand, and quotations show an advance of ½ @ 4½ %.

The stock market was quiet and steady early in the week, but towards the close it became active and strong, with an advance of ¼ @ 5⅞ %. The principal dealings have been in Lake Shore, St. Paul, Northwest, D. L & W., and Western Union. We give below the closing quotations of active shares.

The principal changes in the bank statement for this week are the gain of $3,003,800 in legal tender notes, which shows how strong the current of money is running toward this center, and the loss of $3,203,100 in specie, which reflects the movement of gold from the ownership of private persons, who had the gold on special deposit in the banks, to the ownership of the United States Treasury. As the Treasury has the power to place gold on deposit with banks its disappearance from bank vaults causes no alarm to the money market. The resulting difference, on the total reserve, because of these changes, is only $199,300, and the effect on the surplus reserve, which is also influenced by the change in deposits, is only $24,100; the surplus reserve this week being $14,104,675, against $14,128,775 last week. So far as the money market is concerned the situation is therefore not essentially different from a week ago. The following is a comparison of the averages of the New York banks for the last two weeks:

	May 18.	May 25.	Differences.	
Loans	$233,122,600	$233,997,200	Inc..	$874,600
Specie	23,030,200	19,827,100	Dec.	3,203,100
Legal t'nd'rs	41,020,100	44,023,900	Inc.	3,003,800
Deposits	199,686,100	198,985,300	Dec.	700,800
Circulation.	20,012,300	20,005,800	Dec.	6,500

The foreign trade movements for the week are shown in the following tables:

FOREIGN IMPORTS.

For week ended May 25:

	1876.	1877.	1878.
Total for week.	$5,240,422	$6,782,681	$4,260,532
Prev. reported.	128,037,123	128,829,644	112,722,137
Since Jan. 1	$133,277,545	$135,612,325	$116,982,669

Included in the imports of general merchandise were articles valued as follows:

	Quantity.	Value
Anvils	65	$597
Brass goods	5	434
Bronzes	4	377
Copper		121
Cutlery	58	16,449
Guns	28	6,660
Iron, pig, tons	300	6,133
Iron, sheet, tons	10	1,357
Iron, other, tons	653	25,143
Metal goods	291	16,249
Needles	5	5,183
Nickel	4	1,479
Old Metal		103
Per. caps	8	1,357
Saddlery	5	152
Steel	502	8,737
Spelter	56,000	2,400
Tin, bxs	28,405	108,787
Tin, 300 slabs	21,124	3,009
Wire	101	4,477

EXPORTS, EXCLUSIVE OF SPECIE.

For week ended May 28:

	1876.	1877.	1878.
For the week	$5,224,430	$4,827,590	$6,665,893
Prev. reported	91,575,075	101,872,011	133,702,070
Since Jan. 1	$96,799,505	$106,699,601	$140,367,966

EXPORTS OF SPECIE.

For week ended May 25:

Total for the week	$104,303
Previously reported	7,697,273
Total since Jan. 1, 1878	$7,801,576
Same time in 1877	14,797,274
Same time in 1876	24,193,017
Same time in 1875	33,474,344
Same time in 1874	21,099,780
Same time in 1873	20,314,817
Same time in 1872	22,474,197

Government bonds at the close were quoted as follows:

	Bid.	Asked.
U. S. Currency 6's	121½	122
U. S. 6's 1881 registered	108¾	108⅞
U. S. 6's 1881 coupon	108⅝	108¾
U. S. 6's 1865 new reg	104¾	104⅞
U. S. 6's 1865 cou	104¾	104⅞
U. S. 6's 1867 reg	107⅜	107½
U. S. 6's 1867 cou	107⅜	107½
U. S. 6's 1868 reg	108¼	109¾
U. S. 6's 1868 cou	109	110
U. S. 10-40 reg	107½	107¾
U. S. 10-40 coupon	107½	107¾
U. S. 5's 1881 registered	105¾	105⅞
U. S. 5's 1881 coupon	105⅝	105¾
U. S. 4½'s 1891 registered	103⅜	103¾
U. S. 4½'s 1891 coupon	104⅝	104¾
U. S. 4's 1907 registered	101¼	101⅜
U. S. 4's 1907 coupon	101¼	101⅜

The following were the closing quotations of active shares:

Atlantic and Pacific Telegraph	22½	23
Chicago and Northwest	53⅞	54
" " Pref	77¼	77⅞
Chicago, Rock Island and Pacific	112	112½
Chicago, Bur. and Quincy	104¾	105
Col., Chicago and Ind. Central	4⅛	4⅜
Clev., Col., Cin. and Ind	28	28½
Cleveland and Pittsburgh	80½	81
Chicago and Alton	78	78½
" Pref	101	...
Canton	15¾	17
Delaware, Lack. and Western	56⅛	56¼
Delaware and Hudson Canal	55⅞	56
Express—Adams	102	102½
" American	49	49½
" United States	47½	48
" Wells, Fargo & Co	91	91½
Erie	14⅛	14⅜
" Pref	33	..
Harlem	147	148
Hannibal and St. Joseph	11½	12
" " Pref	27¼	28
Illinois Central	..	84
Kansas Pacific	7½	7⅝
Lake Shore	62⅞	63
Michigan Central	66½	66¾
Morris and Essex	84	84¼
Milwaukee and St. Paul	54⅛	54¼
" " " Pref	80¼	80⅜
Mariposa	1	2¼
" Pref	1¼	3
New York Central	110¼	110⅜
New Jersey Central	23⅞	24
New Jersey Southern	1	1⅛
Ohio and Mississippi	8	8⅛
Pacific Mail	18⅝	18¾
Panama	118	120
Pittsburgh and Fort Wayne	96½	97½
Quicksilver	15¼	16½
" Pref	31	33½
St. Louis and Iron Mountain	6½	7¾
St. Louis Kansas City Northern	4¾	5
" " " Pref	21¼	22
Toledo, Wabash and Western	13⅞	14¼
Union Pacific	70	72
Western Union Telegraph	83⅝	83¾

GENERAL HARDWARE.

The week under review has been an uneventful one in the Hardware trade. No changes in values have been reported, and the volume of business is about the same as the previous week.

That the Paris Exposition is attracting a good many of the prominent Hardware men of the country is evident from the fact that on Saturday last E. Hilger and F. A. Witte, both of St. Louis, and Joseph Lautner, of Allegheny City, sailed from this port for Europe, and to-morrow (30th instant) Samuel A. Haines, of Graham & Haines, will be a passenger by the steamship City of Montreal. Mr. Haines will make an extended tour, visiting the principal cities of Great Britain and the Continent in the interest of manufacturers represented by his house.

We have always believed and frequently said that a personal examination of foreign markets, a study of the habits of other nations and a careful inquiry concerning their needs, is the surest and best way of establishing permanent and profitable commercial relations with them, and we are glad that so many gentlemen, representing our hardware industries, are this season going abroad with this object in view. We wish them pleasant voyages and success in proportion to the enterprise they show in going.

There seems to be a decided tendency toward lower prices on Loose Pin and Loose Joint Cast Butts, including Japanned (but not including Japanned with Silvered Acorns), and for such goods our quotations must be considered nominal.

Horace Durrie & Co., No. 97 Chambers street, have taken the agency for the "Family" Bench Vise. This Vise is made in two sizes, both plain and ornamented, and is offered to the trade at a very low price, as will be seen by the following list, the regular discount from which is 15 per cent. In their circular they say of this Vise: "It is as perfectly adjusted with Malleable Iron Screw, and works as well as an article costing five times as much; is handsomely japanned, or ornamented in colors, and sells at sight. No family can afford to be without one. It is handy for so many purposes. It supplies a need long felt in every household. It can be made fast in a second to a table, counter, arm chair, or any projection. We think that a sample order will demonstrate that they will sell readily, paying the retailer fully 50 per cent. profit."

FAMILY VISE.—PRICE LIST.

			Per doz.
No. 1, Plain Japanned,	1½ in.	Jaw	$6.00
No. 2, "	2 "		7.50
No. 3, Ornamented,	1½ "		7.50
No. 4, "	2 "		9.00

There is an improved demand for Nails this week, which is rather an unusual occurrence so near the close of the month; this is partly accounted for by the very low rates at present ruling, and the prudent and conservative manner in which the trade who buy these goods have acted all through the season, and by reason of which stocks in dealers' and consumers' hands are believed to be unusually light. There is no improvement to note in the tone of the market, which continues in the unsettled condition in regard to prices which we have noticed for several weeks. We quote 10d. to 60d. $2.40, net, in lots of 25 to 100 kegs, but large buyers would have no difficulty in obtaining a concession from this figure.

Burger & Baumgard, No. 98 Duane street, have been appointed sole Eastern agents for the sale of the Monroe Patent Combined Glossing and Fluting Irons. These Irons are made both with brass and nickel plated flutes.

The following circular explains itself:

NEW YORK, May 20, 1878.

DEAR SIR: We have sold our entire stock of Emery to Messrs. Leveridge & Hayes, of No. 113 Chambers street, New York City, and have requested them to fill any orders you may send.

We solicit for them your future orders. Respectfully yours,

THE HART, BLIVEN & MEAD MFG. CO.,
No. 107 Chambers street, N. Y.

Henry Disston & Sons illustrate, in their advertisement on the 29th page, a large assortment of Cross-Cut Saws, both patent and common teeth. In addition to their own brands and patterns of these goods, they make for their customers such special Saws as their localities and trade may require.

The D. K. Miller Lock Co., Philadelphia, have increased their capital. They inform us they are now in a position to turn out a large quantity of goods and to offer them on specially advantageous terms.

We invite attention to the advertisement, on the 5th page, of James Rowland & Co. As previously mentioned, they have commenced the manufacture of Nails, and they are now prepared to fill orders, and solicit correspondence from the trade.

IRON.

American Pig.—The Iron market continues in the depressed condition so frequently noticed of late. Rumors of sales of considerable quantities at low prices are current, but particulars are withheld. Among the recent sales of Iron we hear of a lot of Carbon No. 2 which was purchased by a dealer some four or five years ago at about $40, closed out at $15.50. This sale was made not for want of money on the part of the holder, but from a realization of the hopelessness of carrying it longer in expectation of a better price. We continue to quote: Foundry No. 1, $16.50 @ $18; Foundry No. 2, $15.50 @ $17, and Gray Forge, $14.50 @ $16.

Scotch Pig.—The only transaction reported in Scotch Iron since our last is the sale of 100 tons Glengarnock, to arrive, on private terms. We quote: Glengarnock, $23.75; Eglinton, $22.75, and Coltness, $24.

Rails.—In Iron Rails no business is reported, and in Steel we hear of two orders for 10,000 and 1000 tons respectively, for fall delivery, being placed on private terms. We quote: Steel at mill, $43 @ $44, and Iron according to quality, terms, &c., $32 @ $36.

Old Rails.—In the absence of business, we quote nominally, $17 @ $18.

Scrap.—We quote No. 1 Wrought from yard, $20 @ $21.

METALS.

Copper—Is arriving in large lots from the Lake region, but the demand is light still, manufacturing not going on actively. Sales have thus been confined to 150,000 pounds Lake Superior, at 16¼¢ @ 16½¢. Baltimore may be quoted 16½¢ @ 16¾¢, nominally. Futures of Lake Copper we quote 16¼¢ @ 16½¢, which is also the closing quotation on the spot. London reports no further change, although there are rumors of latest quotations showing a further advance of some importance in Chili Bars. The political news from Europe is now highly favorable. A Congress of the great powers is about to assemble, and there seems to be a general belief that an amicable settlement of existing difficulties will surely be arrived at, a hope which is shared on this side. Should these expectations be fulfilled, there will be ample room for improvement in the entire Metal branch in Europe, the advance in Chili Bars being a sign that the Europeans fully comprehend the advantages which are to accrue to general business, and to Metals in particular, from a removal of these vexed questions which have exercised such a depressing influence on everything on the other side since the late war was brought to a close. It stands to reason that if London takes the lead in a lasting improvement in Copper and other metals, we shall follow after a while, if not immediately. Hence we do not say too much in asserting that, so far as our observation goes, there is a feeling of greater hopefulness in Metal circles in this city which may soon bear fruit in the shape of renewed purchases on the part of dealers and consumers who are still hesitating. Mail accounts have reached us from London bearing date 18th inst. They express themselves to the following effect: "There is little doing in English sorts, which we quote £68 for Ingots; £69, Best Selected; £72, Sheets. Some speculative inquiry has caused an advance in foreign descriptions." The combination prices for Manufactured Copper are unchanged, and at these rates the demand continues on a fair scale. English Yellow Sheathing Metal is in only moderate request, but the price is steady at 14½¢. We quote: New Sheathing Copper, 26¢; Braziers', 28¢, and Bolts, 28¢; American Yellow Sheathing Metal, 20¢; Yellow Metal Bolts, 25¢, and English Yellow Sheathing Metal, 14½¢ @ 15¢, currency, in bond.

Tin.—Our market is steady, after the sale, on private terms, of 1000 slabs Straits. We quote large lines, in gold, as follows: Straits, 14⅜¢; English Refined, 14½¢; do. Common, 14¢, and Banca, 17¢ @ 17¼¢. Of the latter 20,000 slabs sold in Holland by the Trading Society yesterday at a figure not yet officially reported, but presumed to have been 39 guilders the 50 kilos. London cables Straits £62, while Singapore cables $18.25 per picul. The attention of the metal trade at the present moment is attracted more particularly by Tin Plates, which article is in an exceptionally favorable position in view of the prolongation of curtailed production which seems to have been resolved upon in Wales. Instead of three months, the reduced output is to last to the close of the current year, which circumstance places Tin Plates, if coinciding with the peaceful settlement of politics, upon a more solid basis than they have been resting on for a great many years past. This is all the more the case so far as we on this side are concerned, if we take into consideration the light stocks in the hands of consumers and the trade here. While what precedes has become apparent, the market has begun to develop greater activity daily, and has now become very strong, closing as follows: Charcoal Bright, $6 @ $6.25; ditto Ternes, $5.50 @ $5.62½; Coke Tin, $5 @ $5.25, and ditto Ternes, $4.87½ @ $5, all gold, per box, ordinary brands, large lots.

Lead.—Last Thursday 300 tons St. Joseph's Common Domestic sold at 3¼¢, currency, and since then small lots of choice Lead (Refined) have still been placed at the same figure. We hear that Lead is now offered even below 3¼¢, currency, but it would seem that no buyers can be found. The fact is manufacturers seem to be unwilling to buy at anything above 3¢, currency. Stocks remain undiminished. In writing from England they express themselves as follows: "Lead still exhibits no improvement. We quote good soft English Pig, £16. 17/6; Sheet, £18. 7/6; Pipe, £18. 12/6 per ton, less 3½ % free on board; soft Spanish, without silver, £16. 10/ @ £16. 12/6, less 2½ % ex quay." There is some demand for Manufactured at our last quotations, viz., 5½¢ for Bar, 6¢ for Pipe, 6¢ for Sheet and 15¢ for Tin-lined Pipe, all less 10% to the trade.

Spelter and Zinc.—Domestic Spelter remains very dull; we quote the same 4¾¢ @ 5¢, currency, and Refined 8½¢, currency. Silesian we quote 5⅞¢, gold, nominally. It is dull and easy in London, whence another giving way of 12/6 per ton is reported. *Sheet Zinc.*—There is some demand for Sheet, but trade is rather dull and prices more or less nominal. We quote Mosselmann 7⅝¢ @ 7¾¢, gold, and Domestic, 6⅛¢ @ 6¼¢, currency.

Nickel.—Nothing of special interest has transpired in this metal which, as heretofore, we quote $1.30, currency.

Ant mony.—A moderate business is transacting therein; we quote Cookson 12¾¢, gold, and Hallet and other brands, 12⅛¢, gold.

COAL.

The state of the trade during the past week has not been such as to cause great encouragement among dealers in this city, although there has been some little trade done, especially in Lehigh Coals. This increase of trade was naturally expected in view of the rise in price announced for June. The auction sale which took place yesterday showed the effect of the proposed increase of price, and in consequence Coal advanced at the auction sale of the Delaware, Lackawanna and Western Railroad Company between 5¢ and 10¢ per ton. The amount sold was 50,000 tons, deliverable at Hoboken in June. Mr. F. E. Saward kindly furnishes us the following figures:

	Sold at	Average.
5,000 tons Steamer	$3.42½ @	$3.42½
10,000 tons Grate	3.45 @	3.45
10,000 tons Egg	3.55 @ $3.60	3.56½
20,000 tons Stove	3.75 @	3.75
5,000 tons Chestnut	3.25 @	3.25

The following is a comparison with previous sales this year:

Size.	Jan. 30.	Feb. 27.	March 27.	May 1.
Steamer	$3.10	$3.11½	$3.25	$3.30⅝
Grate	3.12½	3.07½	3.21½	3.30
Egg	3.14	3.15½	3.40	3.45
Stove	3.57	3.55	3.69¾	3.76⅞
Chestnut	3.11	3.00	3.18	3.15
Pea	...	2.12½	...	...

Prices are much unsettled. The Lehigh Valley Company quote their circular rates as net, but have not advanced their prices. Much doubt is expressed in various quarters in regard to the continuance of the combination, many deeming it impossible for it to last through the season; others, however, think that it will have no trouble and assert that it is stronger than any combination which has preceeded it.

OLD METALS, PAPER STOCK, ETC.

The market for Old Metals, Paper Stock, Rags and other junk materials has continued without any special feature of interest since our last report. Business is without activity and prices remain nominally unchanged.

The purchasing prices offered by dealers for Old Metals are as follows:

Copper, heavy	per ℔	$0.12½ @	..
Copper Bottoms	"	.10½ @	....
Yellow Metal	"	.10 @	....
Brass, heavy	"	.09½ @	....
Brass, light	"	.08 @	....
Composition, heavy	"	.11½ @	....
Lead, solid	"	.02¾ @	....
Tea Lead	"	.02½ @	....
Zinc	"	.02¾ @	....
Pewter, No. 1	"	.09 @	...
Pewter, No. 2	"	.07 @	...
Wrought Iron	pr ton.	$16.00 @	....
Light do	"	9.00 @	....
Stove Plate	"	9.00 @	....
Machinery do	"	10.00 @	....
Grate Bars	"	3.50 @	....

The prices current for Rags, &c., are as follows:

Canvas, Linen	per ℔	3 c. @	3½c.
" Cotton, No. 1	"	5 c. @	....
" " No. 2	"	2½c. @	...
White, No. 1	"	4½c. @	....
" No. 2	"	2¾c. @	....
Seconds	per ℔	2 c. @	..
Mixed, Woolen	"	2 c. @	3 c.
Soft, do	"	5½c. @	6 c.
Gunny bagging	"	3 c. @	....
Jute butts	"	2¾c @	...
Kentucky bagging	"	3 c. @	....
Book Stock	"	2½c. @	....
Newspaper Stock	"	1¾c. @	1½c.
Waste Paper and Scraps	"	1½c. @	...
Kentucky Bale Rope	"	4 c. @	...
Oakum Junk, No. 1	"	4½c. @	5 c
" " No. 2	"	3 c. @	...
Tarred Shaking	"	1 c. @	1¼c.
Grass Rope	"	.. @	2½c.

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending May 28, 1878.

Danish West Indies.

	Quan.	Value.
Hdw., pkgs	7	$95
Iron, bars	161	140
Sew. mach., cs	3	150

Hamburg.

Belting, cs	3	787
Mach'y, pkgs.	13	1,876
Ag. imp., pkgs	255	11,073
Sew. mach, cs.	702	20,371
Arms, cs	2	115
Hdw., pkgs	93	3,990
Railroad cars.	2	1,250

Bremen.

Mach'y., pkgs	111	11,828
Hdw., pkgs	26	1,386
Mf. iron, pkgs	58	2,600
Copper, bbls.	9	1,925
Ag. imp., pkgs	386	12,124
C'ge mtl., pgs.	16	275
Sew. mach. cs.	2	300

Rotterdam.

Belting, cs	2	390
Pumps, pkgs.	11	400
Hdw., cs	14	554
Ag. imp., pkgs	22	1,023
Wringers, cs	29	1,200
C'ge mtl. pkgs	3	126
Sew. mach., cs	4	175

Antwerp.

Iron safe	1	225

New Zealand.

	Quan.	Value.
Ag. imp., pkgs	161	$4,965
Belting, pkgs.	2	612
Tacks, pkgs	5	55
Wringers, cs	12	322
Axles, cs	7	149
Hdw., pkgs	505	8,838
Pumps, pkgs.	11	591
Mach'y, pkgs.	8	1,125
Chains, pkgs.	4	320
Tinware, cs	5	64
Nails, cs	18	85
Wash. ma., cs	20	224

British North American Colonies.

Mf. iron, pkgs	15	135
Wheels, pairs.	10	597
Tinware, cs	3	75
Hdw., pkgs	80	1,216
Iron, pkgs	11	35
Brass g'ds, cs.	1	90

United States of Colombia.

Cutlery, cs	3	194
Nails, kegs	18	51
Brass g'ds, cs.	10	190
Iron, pkgs	20	92
Cartridges, cs	7	466
Revolvers, cs.	3	591
Mf. iron, pkgs.	50	479
Hdw., cs	82	2,663
Carbines, cs	4	1,200
Springs, pkgs,	11	405
Mach'y, pkgs.	64	1,477
Pl'td ware, cs.	14	1,041
Sew. mach., cs	32	1,050
Tinware, cs	3	97

Brazil.

Cutlery, cs	125	3,780
Tinware, case	1	256
Mf. iron, pkgs	38	386
Hdw., cs	15	264
Irons, cs	10	75

Liverpool.

Mach'y, cs	32	2,753
Ag. imp., pkgs	183	12,785
Hdw., cs	166	6,532
Pumps, pkgs.	4	530
Sew. mach., cs	51	1,067
W't'r wh'ls, bxs	2	520
Burners, cs	11	625
Belting, case.	1	555

Bristol.

Mach'y, cs	7	406

Hull.

Pumps, pkgs.	4	300
Hdw., cs	36	1,037
Mf. iron, pkgs	13	200
Em'y wh'ls, bx	1	102
Mach'y, cs	5	2,800
Ag. imp., pkgs	7	405

Glasgow.

	Quan.	Value.
Ag. imp., pkgs	351	$26,731
Sad irons, bb'ls	16	480
Belting, case	1	475
Hdw., cs	10	200

Havre.

Copper, pkgs.	1304	38,000
Hdw., cs	3	90
Guns, case	1	200
Mach'y, pkgs.	17	1,587
Sew. mach. cs	210	2,992
Ag. imp., pkgs	206	23,345

Barcelona.

Pl'td ware, cs	8	52
Ag. imp., pkgs	2	1

Porto Rico.

Pl'td'w're, pgs	8	525
Mf. iron, pkgs	7	146
Hdw., pkgs	6	92

China.

Hdw., cs	21	430
Coal, tons	230	920

Venezuela.

Tinware, cs	9	346
Mf. iron, pkgs.	18	679
Mach'y., cs	4	158
Sew. mach., cs	30	1,174
Nails, kegs	19	192
Hdw., cs	110	2,112
Barrows	6	21
Grindstones	4	30
Cutlery, cs	2	52

Cuba.

Hdw., cs	99	1,060
Wire, pkgs	8	300
Grindstones	312	182
Tinware, cs	4	43
Sew. mach., cs	388	9,469
Coal, tons	464	1,795
Mf. iron, pkgs.	73	954
Nails, kegs	107	273
Ag. imp., pkgs	42	1,706
Mach'y, cs	13	983
R. R. mtls. pgs.	519	14,754

British West Indies.

Mf. iron, pkgs	46	54
Hdw., cs	24	352
Nails, kegs	18	56
Sew. mach., cs	2	48
Tin, pkgs	6	87
Barrows	30	151

Argentine Republic.

Car wheels	206	5,200
Mf. iron, pkgs.	2	104
Cutlery, case.	1	102
Revolvers, cs.	1	265
Hdw., cs	41	891
Mach'y, pkgs.	6	2,210
Arms, cs	2	126

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending May 28, 1878:

Hardware.

Bergmann Aug. & Co., Cases, 4
Boker Hermann & Co., Hardware and cutlery, pkgs., 15
Folsom H. & D., Guns, cs., 4
Guental G. & Son, Screws, cs., 10
Hawley M. C., Cases, 2
McKimless J. A., Cases, 1
Moore's J. P. Sons, Gun stocks, cs., 6
Squires H. C., Guns, cs., 1
Schoverling & Daly, Guns, cs., 1
Van Wart & McCoy, Cases, 5
Varney & Doe, Per. caps, cs., 8
Van Nest A. R. & Co., Mdse., pkgs., 3
Wolffe S. N. & Co., Ironware, cs., 17
Woodruff A. J. & Co., Cases, 2
Ward Asline, Cutlery, cs., 2
Wiebush & Hilger Hardware Co., Cutlery and hdw., cs., 8
Order, Files, cks., 6; Guns, cs., 2; Bundles, 205; Anvils, 200

Iron.

Hope Adam & Co., Bundles, 91
Jansen, J. A., Spiegel, kilos. 152,934; tons, 750
Marvel W. D., Ore, tons, 300
Naylor & Co., Bars, 12,253; Wire rope, coils, 1083
Prosser Thos. & Son, Tubes, bdls., 42
Upson & Walton, Wire rope, coils, 7
Order, Bundles, 60; Ore, tons, 248; Pig, tons, 250; Bars, 2261; Rough Bars, pcs. 946; Galvanized wire netting, rolls, 110; Wire rope, coils, 6

Steel.

Friedmann & Lauterjung, Cases, 4
Guental Geo. & Sons, Wire, cks., 1
Prosser Thomas & Son, Tyre forgings, 31
Woodford W. O., Bundles, 95; Bars, 10; Cases, 10
Order, Rods, bdls., 112; Cases, 5; Casks, 3

Metals.

Agostini J., Scrap copper, cs., 1
Byrne Jos. & Co., Tin plates, bxs., 648
Cort N. L. & Co., Tin plates and taggers, bxs., 1050
Darrell & Co., Scrap metal, pkgs. 4
Drexel, Morgan & Co., Tin plates, bxs., 760
Douglass James & Co., Scrap metal, bbls., 2
Grinnell, Minturn & Co., Metal sheath'g, cs. 50
Hopkins E. T., Tin plates bxs., 167
Meyer Moritz, Lead, bars, 6958
Moore D. & Co., Tin plates, bxs., 328
Merchant & Co., Tin plates, bxs., 95
McCoy & Co., Nickel, cs., 4
May S. & Co., Tin plates, bxs., 82
Phelps, Dodge & Co., Tin plates, bxs., 4099
Wessells G., Scrap brass, tcs, 1 pcs., 10; Brass, bbls., 1628
Order, Tin, ingots, 722; Tin plates, bxs., 2183; Tin plates and taggers, bxs., 735; Tin and terne plates bxs., 194
Without bill of lading, Tin plates, bxs., 1724

PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St.
PHILADELPHIA, May 28, 1878.

Pig Iron.—The market shows no material change since last week, although there is a steadier feeling and prices have become somewhat more uniform than they were a few days ago. There are rumors of lots offering at low prices, but business seems to have settled down to more of a level, and ordinary sales have been on the basis of quotations herewith, with exceptional transactions at both higher and lower figures. Buyers appear unwilling to anticipate their requirements even at the low prices now ruling, but there seems to be an impression that if bottom figures have not already been reached they will be some time during the next two months. Sellers are determined to find a market or abandon the business, and in fact the circumstances of many companies will leave them no alternative. The present demoralized condition of the market is not without some compensating features, and the one referred to, by enforcing a curtailment of production, may perhaps be the means of eventually bringing relief. At any rate, sellers appear determined not to accumulate stock, so that in the competition now waged, it looks as though only the fittest would survive. It must not be understood, however, that standard brands can be bought at any price buyers choose to offer. All descriptions of Iron are, of course, affected by the prevalent weakness in the tone of the market; but as we have mentioned before, certain well-known brands are always in demand, and are to some extent a necessity, hence there is no accumulation of stock. A very slight yielding in the price of a brand specially desired would secure a sale, when

a much larger reduction in the price of another brand not desired would fail to attract a purchaser. We quote the market feverish and unsettled at $17.50 @ $18 for No. 1 Foundry; $16.50 @ $17 for No. 2, do., and $15.50 @ $16.50 for Gray Forge. Bessemer Iron is firm, and the tendency toward higher figures.

Ores.—Magnetic Iron Ores are quoted at $2.50, f. o. b. at Hacklebarney mines, for "Blue" Ore, hand broken and selected. "Red" Ore, price $2.75 f. o. b., cars.

Blooms.—The market is dull and weak, with average transactions at about $1 to $2 below quoted rates, which may be considered almost nominal. We quote: Sunken Scrap Blooms (2464 lb), $42 @ $45; Northern Ore Blooms (2240 lb) $37 @ $39; best quality Charcoal Billets (2240 lb), for wire and steel purposes, $50 @ $55; Bars do, $65 @ $67.50; Sheet Iron Blooms, cornered (2464 lb), $58 @ $60; Cold-blast Charcoal Plate Blooms, $53 @ $55; run-out Anthracite, $50 @ $52.50.

Muck Bar.—There is no demand, and no out-and-out sales have been made for some time past. Sellers ask equal to $30 or $33, Philadelphia delivery, according to quality.

Structural Iron.—During the past few days contracts have been closed for several thousand tons of Iron, chiefly for bridge building and the New York Elevated Railway. These orders have been on the market for some time past, and, as indicated in our report of May 2, have been held over until toward the end of the month; they will be sufficient to give the mills full employment for some time to come. The contracts for the New York Elevated Railway, closed yesterday, are: 3400 tons finished Iron to the Phœnix Iron Company, 3400 tons to the Passaic Rolling Mill Company, and 1500 to 2000 tons to Capt. J. F. Bailey, who places the order with the Edgemoor Iron Company. Other contracts for considerable quantities will probably be closed this week. Several leading railways have given out (or are about doing so) contracts for bridges, the most important being in Pennsylvania and Illinois. The mills employed on specialties of this kind have therefore good prospects, which it is hoped will soon extend to other branches of the Iron trade. We continue former quotations as follows: Angles, 2.25¢ @ 2.50¢; Tees, 2.50¢; Beams, 2.7¢ @ 2.3¢; Cannels, 2.7¢ @ 2.8¢.

Plate and Tank Iron.—There has been an active inquiry for Plate Iron during the past few days, and orders in the aggregate have been of considerable amount. Several of the leading mills are full of work up to about the middle of next month, with inquiries of such a character as to warrant favorable anticipations of additional business at an early date. The anxiety of sellers to keep their mills occupied prevents any improvement in prices, and the quotations herewith would no doubt be shaded considerably for large lots prompt cash payment. We quote: Common Plates, 2.2¢ @ 2.3¢; Tank Iron, 2.3¢ @ 2.5¢; C. No. 1, 2.4¢ @ 2.6¢; Shell Iron, 2.75¢ @ 2.9¢; Flange Iron, 3.75¢ @ 4¢; Solid Firebox, 4.85¢ @ 5¢; and Best Bloom, 5.5¢ @ 6¢.

Sheet Iron.—The market has been without improvement, and dullness has been the leading feature of the past week. The week opens with somewhat better prospects. Several fair-sized orders have been placed, and with more inquiry for Sheets manufacturers begin to hope that the period of stagnation will soon be over. In the meantime, nominal prices for small lots are as follows: Refined Sheet Iron, No. 25 to 28, 3.4¢ @ 3.5¢; No. 22 to 24, 3.3¢ @ 3.4¢; No. 16 to 21, 3.2¢; Best Bloom Sheets, No. 25 to 28, 5.2¢ @ 5.4¢; No. 22 to 24, 5¢; No. 16 to 21, 4.7¢ @ 4.8¢; Common Red Plates, 5-16 to 18, 2.4¢ @ 2.5¢; Refined Plates or Blue Annealed, 5-16 to 18, 2.5¢ @ 2.6¢; American, R. G., 5-16 to 18, 3¢ @ 3.1¢; Best Bloom, 5-16 to 18, 4.9¢ @ 5¢; Philadelphia Russia, 6¢ @ 6.5¢; A. Patent Planished, 10½¢; B. Patent Planished, 9½¢; Bloom Galvanized, 40%; Refined Galvanized, 50%.

Bar Iron.—The demand seems to be more active, but prices are irregular and unsettled, and the general condition of the trade in this vicinity is in no respects improved. Our remarks of last week would be entirely applicable again this week, and so far as we can see there is no change whatever. The average price obtained for Bar Iron is probably less than it was some time ago, but as the best Iron is firmly held, it is surmised that purchasers are less discriminating in quality than they were previously. We quote: Best Refined, 2¢; Medium, 1.75¢ @ 1.85¢; and Common, 1.5¢ @ 1.6¢.

Steel Rails.—The demand during the week has been quite active, and it is said sellers have been compelled to decline orders for considerable quantities at full prices, solely because of their inability to make the deliveries. The majority of the mills are said to be full up to about November, and they are, therefore, indifferent to taking orders, unless for deliveries to suit their own convenience. The heavy traffic on the railways and their increased earnings seem to indicate that there will be a continued active demand for Rails, which, with the fact previously stated, makes sellers rather indifferent unless conditions of sale are entirely favorable to themselves. We quote about $43 @ $45, cash, at mill, according to location, with somewhat lower figures for deliveries in the fall.

Iron Rails.—The week past has been rather quiet, but the mills are all pretty well employed, and as there are known to be additional orders on the market to be placed at an early date, the firmness noted during the past few weeks is fully maintained. There is a report here of some considerable sales having been effected of foreign Rails in bond, but we cannot learn anything definite in regard to the matter, and it is probably incorrect. We quote, say $32 @ $34.50 at mills, according to section, quality and terms of payment.

Old Rails.—The dullness noted in late reports seems to continue, and in consequence of the indifference of buyers prices have gradually weakened and $19.50 may now be considered an outside figure. Sales during the week have been in lots of a few hundred tons each, at about quoted rates. The market is in a sensitive condition, however, and any crowding on the part of sellers would probably cause prices to be marked down again. Offerings are not excessive, hence the comparative steadiness in prices. We quote prices nominal at $18.50 @ $19.50.

Scrap Iron.—There is a fair demand and prices are steady and unchanged. Sales, according to quality, Wrought, $21 @ $23; Cast, $14 @ $15.50.

Nails.—The market is very dull and prices are somewhat irregular, although $2.40 is the figure named as the wholesale price.

Lead.—The market is again lower, with 3⅜¢ as an average quotation. Manufactured is steady at 5½¢ for Bar, 6¢ for Pipe, and 6½¢ for Sheet. Shot is moderately actively as follows: Chilled, 9¢ @ 10¢; Drop, 7½¢ @ 8½¢; Buck, 8½¢ @ 9½¢, all less the regular trade discount of 10%.

PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue, Pittsburgh, May 28, 1878.

General business continues to slacken, as it nearly always does at this season of the year; particularly is this the case in regard to manufactured goods, although the aggregate, there is reason to believe, will compare favorably with the corresponding time last year. The movement in Iron, Nails, Steel, Window Glass and other manufactures here in Pittsburgh from January 1st up to the present time has been in excess of that of any corresponding time for some years, which may be attributed largely to cheap freights; but with a continued active competition, the margin for profit has been and continues very small, and herein is the great source of complaint. In a word, there is business enough, some of our largest manufacturing establishments having been working up to their utmost capacity all this year, but many of our manufacturers will be satisfied if they can hold their own, or, to use an old saying, get a new dollar for an old one.

The apprehension that the recent frosts had damaged the crops has about been dismissed. The accounts from nearly all points report that the great staples, wheat in particular, have sustained little or no damage, and there is every prospect at the present of an abundant harvest. With good crops, Congress adjourned, and, above all, a restoration of confidence, a decided improvement in trade the like of which we have not had since the panic may be confidently looked for this fall.

Pig Iron.—The situation has not changed much during the past week. Commission merchants without an exception continue to report business very dull, and they do not look for any improvement until July, after stock-taking. June is usually a dull month, as the consumption nearly always falls off largely, and mill men make it a point to have as little pig on hand as possible when they shut down to take stock. The supply in hands of consumers is unusually light. They have almost without an exception adhered closely to the hand-to mouth policy, buying only as immediate necessities require, and to day many of them have not a week's stock in yard, nor will this course be deviated from as long as the market is on the downward track; and it is doubtful whether to-day contracts could be made for future delivery at current rates, which, it is very generally admitted, are down below cost of production. As stated in our last report, furnacemen are in a worse condition now than at any time yet, as depreciation is still the order of the day, with the cost of production much the same as at the opening of the year, and in the absence of a radical change in the situation, an advance in prices or a material reduction in the cost of production, a general "blowing out" seems almost inevitable. Bituminous Coal Smelted Irons, $19 @ $21, 4 mos., for Foundry; $17 @ $19, 4 mos., for Gray Forge, the latter figure for best brands of open Gray Red-short, but few sales above $18.50; Coke Irons, $18 @ $20 for Foundry, and $15 @ $17, 4 mos., for Gray Forge; Hanging Rock Charcoal, $20 @ $22, 4 mos., for Mill; $23 @ $26, 4 mos., for Nos. 1 and 2 Foundry; do. Cold-blast, $35 for "Vesuvius" and $38 for "Hecla." Eastern Cold-blast, last sales at $27, cash. Southern Charcoal Irons very dull.

Ores.—The market continues very dull and considerably demoralized, as in the case of Pig Iron. The demand is very light, and furnaces generally, instead of buying six months' or a year's stock, are ordering just as their needs require. It is very generally admitted that Ores are much higher relatively than Pig Iron. As compared with this time last year, the former is 50¢ ℔ ton lower, while the latter has declined fully $3 ℔ ton during the same time. Ore companies allege, it is true, that they are down to bed rock—that Ore cannot be got out and sold below current rates except at a loss, and it is also intimated that the sources of supply do not promise to be as prolific in their yield in the future as they have been in the past. It is but proper to state in this connection, however, that the high prices demanded by the old companies have led to increased development in new territories, and the result is that new Ores are being introduced and threaten to supercede the old ones unless the price of the latter is reduced to correspond with Pig Iron. Ore companies, it would appear, want the furnacemen to stand all the brunt of the hard times, as they have done for some years past, but it looks now as if the ore men would be obliged to stand their share of the effects of the panic as well as the furnacemen, and it is only just and proper that they should. It is stated that one ore company divided $400,000 among its stockholders last year, while furnacemen, during the same time, did well to hold their own; some of them, as is well known, came out behind and were obliged to get an extension or go into bankruptcy. We have no design to make war upon the ore men, on the contrary, we are anxious for them to prosper, but it does not seem right that they should get all and the furnacemen nothing.

Manufactured Iron.—The demand for all kinds of finished Iron is falling off; orders are not coming forward as freely as they did a month ago, yet the aggregate business is fair for the season. A member of one of our oldest firms said the other day that up to the present time they had done more business this year than during same time in 1877, and this we have reason to believe has been general, but prices of the ordinary sizes have been unremunerative, and herein is the great source of complaint. Nearly all of our mills have specialties of one kind or another in which there is a margin for profit, and enables them to meet competition for the ordinary grades of Merchant Iron. We continue to quote upon a basis of 1.70¢ @ 1.80¢, 60 days, for Merchant Bars, that is for good stock.

Nails.—The demand is light, as compared with what it was in March and April, but there is little or no stock here, and the factories are nearly all in operation, some of them working up to their full capacity. There has been no limit to production this month, it having been agreed at the last meeting of the association to allow each firm to do as they pleased in this respect until the next meeting of the association, which, if we mistake not, takes place on the second Wednesday of June. Prices continue easy, and we now quote at $2.15, 60 days, 2% off for cash, for car-load lots, and $2.25, 60 days, in a jobbing way.

Horse and Mule Shoes—Continue quiet and unchanged; Juniata brand still quoted in 100-keg lots at 3¼¢ @ 4¼¢, cash.

Steel.—The demand is light as compared with what it was a month or more ago, and it is not likely that any large contracts will be made until after harvest; still there is a very fair business. Most of the mills have about all they can do, and prices, as a rule, are pretty well sustained. Tool Steel, 11¢ @ 13¢, according to quality; Spring Steel, 6¢ @ 7¢; Boiler Plates, 7¢ @ 8¢; Tire Steel, 4¢ @ 5¢.

Rails.—Steel Rails quoted steady at $44 cash, at works, free on cars. Rail Ends in light supply with some inquiry, $26 @ $28, cash; Steel Blooms, $41, cash; ditto Billets, $43.50 @ $43.60, cash. Old Iron Rails unchanged at $20 @ $21.50, cash, according to quality, with sales of 2000 tons within range of quotations. It looks as if the consumption of Old Iron Rails was destined to be larger this year than last, as they appear to be going into more general use.

Wrought Iron Pipe.—The demand continues to advance with the season, but prices remain unsatisfactory, being much lower than at this time last year, when they were thought to be low enough. Discounts still quoted at 60 @ 65% off regular list.

Scrap.—The market continues quiet, with but little change in prices recently. Old Car Wheels, $18.50 @ $19.50; No. 1 Wrought Scrap, $22.50 @ $23; Tank Scrap, $14; Cast Railroad Scrap, $15; Boiler Scrap, $24; Car Springs, $34 @ $35; Car Axles, $27 @ $29; Axle Turnings, $16 @ $17.

Window Glass.—The demand is light as compared with what it was a month or two ago, but it is fair for the season. No change in discounts. Car-load lots, 75; smaller lots, 70. We can report a sale of 3500 boxes at 75 off, and 2% off for cash.

Coke.—The demand continues quite active and the market is firmer, but prices no better. We continue to quote at $2.15 @ $2.17 per ton, delivered free on cars in Pittsburgh. The largely increased consumption is owing to its cheapness, causing it to take the place of coal.

Coal.—Some of the collieries in the Monongahela Valley have started up, the miners having agreed to resume at the reduction. The price paid for mining now is 2½¢ per bushel, a reduction of ½¢.

CHATTANOOGA.

Office of *The Iron Age*, Market and 8th Sts., Chattanooga, May 28, 1878.

General business shows little activity. About 50,000 bushels of grain and much produce besides arrived by flat-boats since our last report, the only effect of which seems to be a slight depression of the market. The unseasonably warm weather probably has a good deal to do with the dull course of trade. During Thursday, Friday and Saturday the thermometer reached close to the nineties, and has stood during the middle part of the day not below 84 degrees. This is not the sort of atmosphere to inspire enterprise and provoke action. The Pig Iron trade is dull, with nothing else to report of it. Merchant Bars, Bolts, Spikes and Track supplies generally and most of the list of railway supplies are in fair demand at quotations. Nails still feel the injurious and reckless competition of Upper Ohio mills, though the mills here manage to dispose of their products without further reduction of rates.

Pig Iron.—We quote: Coke Irons, No. 1 Foundry, $17 @ $18; No. 2, $15 @ $16; Gray Forge, $13 @ $14; White and Mottled, $11 @ $12. Hot Blast Charcoal—No. 1 Foundry, extra, $20 @ $21; do., $18 @ $20; No. 2 Foundry, $16 @ $18; Gray Forge, $15 @ $17; White and Mottled, $15. Cold Blast Charcoal—Car Wheel Metal, $22.50 @ $27.50; do., Extra Standard, $24.60 @ $29.50; Forge, $17.60 @ $22.

Muck Bar.—$27 @ $34: Old Rails, $16.50 @ $17.50. Old Car Wheels, $18.

Ores.—Brown Hematite, 50 to 56%, ℔ ton, $1.75 @ $2.25. Red Fossiliferous, 50 to 56%, ℔ ton, $1.70 @ $1.90. The above prices for Ores delivered in Chattanooga on cars or on the wharf from flat-boats.

Nails.—We quote at $2.40, with usual discount in large lots.

Manufactured Iron.—The bar mills are busy running double turn and disposing of all they make. A hopeful item of the trade is the fact that no stocks can be found at any of the mills, and very small lots of any kind of Manufactured Iron are in warehouses. Bar we quote at $2. We quote: Railroad Spikes, $2.50; Light Rail, 2.25; Track Bolts, $3; Trestle Bolts, $4.

Coke.—No change. Supply ample and quotable at usual price, $2.50 ℔ ton on cars in Chattanooga.

Coal.—The supply is full, though there is an effort to shorten production as much as possible. Vulcan mine, near Etna, in Marion county, has suspended. The rest of them are barely doing enough to keep their hands—mostly convicts—reasonably busy. We quote run of mine at $1.50 @ $2 ℔ ton on cars in Chattanooga.

BOSTON.

May 25.—*Pig* is weak, and cash buyers could probably obtain concessions from our quotations. The competition among the furnaces is sharper than ever, and the North River Irons particularly are meeting with a larger sale than ever before, owing to their extreme cheapness. We quote: $20.50 @ $21 for No. 1, $19 @ $19.50 for No. 2, and $18.50 @ $19.25 for Gray Forge. *Bar* continues quiet and steady, quoting $40 for Refined and $34 @ $35 for Bolt; American Rails, $32 @ $37; Steel Rails, $42 @ $43, from mill. Nails are in light demand at unchanged prices. Sheet is selling at 3¢ @ 3¼¢ ℔ lb. Russia is quiet at 10¾¢ @ 11¢. We quote English Spring Steel at 7¢ @ 8¢, gold; 9¢ @ 11¢ for German; 9¢ @ 11¢ for Machinery; 14¢ @ 15¢ for Cast; 10¢ @ 12¢ for Blister; 8¢ for American Spring; 13¼¢ @ 14¢ for Cast; 9¢ for Blister; and 8¢ for Machinery. The Atlas, from Liverpool, brought 134 bdls. and 8 cases steel, H. B. Jackson; 22 bdls. and 10 cases Steel, Richard Nicholson; 350 bdls. Steel, Fuller, Dana & Fitz. The Iberian, from Liverpool, brought 339 coils iron, Brown Bros.; 361 do. wire rods, Naylor & Co.; 3412 bars Iron, Thayer & Lincoln; 75 bars Iron, Nightingale & Kilton; 34 bdls. Steel, order. The Massachusetts, from Liverpool, brought 9 cases, 1 cask and 63 bdls. Steel, Wetherell Bros.; 337 bdls. and cases Steel Bars, Randall & Jones. *Copper* is dull, and it is understood that sales have been effected at less than 16½¢. The Iberian, from Liverpool, brought 100 Yellow Metal Bolts, Thayer & Lincoln. For Manufactures we quote: New Sheathing, 28¢; Bolts and Braziers, 30¢; Yellow Metal Bolts, 25¢ @ 25½¢; do. Sheathing, 20¢. *Lead* is weak, with scarcely anything doing, and we reduce our quotations. We quote: Pig, 3⅜¢, currency; Sheet, 6¢; Pipe, 6¢; Tin-Lined Pipe, 15¢; Bar Lead, 5½¢; all of these, excepting Pig, are subject to the usual trade or 10% discount. *Antimony* is firm at 13¢ @ 13¼¢, gold, for Boston spot lots. *Spelter* is easy, closing at $5.12½ on the spot for 10-ton lots. *Tin* is very dull, and prices favor the buyer. The Atlas, from Liverpool, brought 453 bxs. Tin Plates, order. The Iberian, from Liverpool, brought 359 bxs. Tin Plates, Thayer & Lincoln; 1507 do. do. do., order. The Massachusetts, from Liverpool, brought 700 bxs. Tin Plates, Fuller, Dana & Fitz; 55 blocks Tin, 422 bxs. Tin Plates, order. We quote: Straits, 14⅜¢ @ 14½¢; Banca, 17¼¢ @ 17⅜¢; Refined English, 14¾¢ @ 15¢, gold. We quote Plates: Charcoal, I. C., $6 @ $6.25; Coke, $5.25 @ $5.50; and Terne, $5.50 @ $6, gold.—*Commercial Bulletin.*

BALTIMORE.

Mr. W. N. Wyeth, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following prices, under date of May 27: This market remains quiet and unchanged for the past week, and with only a moderate jobbing demand for early wants at annexed quotations:

Refined Bar Iron, 1 to 6 wide by ⅜ to 1 thick	℔ lb	1.85 @ 2 ¢
Refined Bar Iron, 1 to 4½ wide by 1⅛ to 2 thick	"	1.85 @ 2 ¢
Refined Bar Iron, ¾ to 2, Round and Square	"	1.85 @ 2 ¢
Hoop iron, 1⅛ wide and upward	"	2½ @ 2¾¢
Band Iron, from 1¼ to 4 in. wide	"	2¾ @ 2½¢
Horse-shoe Iron	"	3 @ 3½¢
Norway Nail Rods	"	4¾ @ 5¼¢
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	"	13 @ 14 ¢
Machinery Steel	"	8 @ 10 ¢
Cast Spring Steel	"	6 @ 6½¢
Homogeneous Steel Plate	"	7 @ 7½¢
Common Horse Nails	"	13 @ 16 ¢
R. R. Spikes, 5½x9-16		2⅛¢ @ 2¼¢
Perkins' Horse shoes, ℔ keg of 100 lbs		$3.37½
" Mule shoes		4.37½

	10	9	8	7	6
Putnam Horse Nails ℔ M	18	19	20	21	23¢
Globe Horse Nails ℔ M	18	19	20	21	23¢

Less list discount to the trade.

Messrs. R. C. Hoffman & Co., Iron and Commission Merchants, No. 23 South Frederick street, report the Pig Iron market as follows, under date of May 27: The Iron market shows no improvement, and for best brands only are prices maintained at about following rates:

Baltimore Charcoal Pig	$28.00 @ 29.00
Virginia " "	27.00 @ 29.00
Anthracite No. 1	19.00 @ 20.00
" No. 2	18.00 @ 19.00
" No. 3	17.00 @ 18.00
" Mottled and White	14.00 @ 15.00
Charcoal, C. B. Blooms	50.00 @ 52.00
" " Billets	52.00 @ 55.00
Refined Blooms	45.00 @ 50.00

ST. LOUIS.

Specially reported by Messrs. Spooner & Collins, Iron Commission Merchants, 217 North Third street, St. Louis, under date of May 23: Pig Iron business is still quiet. Our market has shown no special change the past week. Prices are unchanged on standard brands of Iron. Old Rails are dull, and the indications of the future is lower prices.

	No. 1.	No. 2.	Mill.	White and M't'ld	
M'souri Stone Coal	$22.00	$20.00	$19.00	$16.00	
Missouri Charcoal	20.00	19.00	18.50	17.00	
Tenn. Charcoal	22.50	20.50	18.50	17.00	
South. Coke, soft and strong	23.00	21.00	19.00	Mottled. 18.00	White $18.00
Hang. Rock Charcoal	25.00	24.00	23.00	.....	
Hang. Rock Charcoal, Cold-short.	23.00	.....	.....	.....	
	Extra No. 1 I. M. Ore.	No. 1 I. M. Ore.	Extra A No. 1 Native.	No. 1. Native.	Alice, Am. Scotch
Hang. Rock Coke, equal to Scotch.	25.00	24.00	24.50	23.50	23.00
	Extra No. 1.	No. 1.	B No. 1.	No. 2.	
West Va. Coke	23.50	23.00	22.00	21.50	

COLD-BLAST CHARCOAL—All Numbers.

Hanging Rock	4 mos.	$25.00 @ 38.00
Tennessee	4 mos.	26.00 @ 30.00
Kentucky	4 mos.	26.00 @ 30.00
Missouri	4 mos.	26.00 @ 30.00
Georgia	4 mos.	26.00 @ 30.00
Alabama	4 mos.	26.00 @ 30.00
Assorted Bar Iron		2.00 @ 2.10
No. 1 Railroad	℔ 100	.90 @ 1.00
Heavy Cast Scrap	"	.65 @ ....
Light " "	"	.55 @ ....
Old Rails	4 mos.	20.00 @ 20.50
Old Car Wheels	4 mos.	16.00 @ 17.00

RICHMOND.

Mr. Asa Snyder, Iron Merchant and Furnace Agent, Richmond, Va., writes as follows under date of May 27: Were it not for the light stock of Pig Iron on this market and the small receipts, the dull sales would create a sharp decline in price. The market values are weak, but quotable as follows:

Va. Cold-blast Charcoal, Cold-short	$20.00 @ 24.00
Va. " " Neutral	28.00 @ 29.00
Va. Warm-blast " Cold-short	19.00 @ 22.00
Anthracite, American Scotch	23.00 @ 24.00
" No. 1	19.50 @ 20.50
" No. 2	18.50 @ 19.50
" No. 3	17.50 @ 18.50
" Mottled	15.00 @ 15.50
Coke, (West Virginia) No. 1	21.00 @ .
" " No. 2	20.00 @ ....
Old Rails	16.00 @ 17.00
Wrought Scrap No. 1	18.00 @ 19.00
Cast " (machinery)	16.00 @ 17.00
Richmond Refined Bar Iron	2.00 @ 2 1-10
Horse Shoes per keg	4.50 @ 4.75
Mule " "	.... @ 5.75
Old Dominion Nails, Standard Size, ℔ keg	2.60 @

Freight to New York, $1.75; Philadelphia, $1.50, per ton of 2240 lb.

LOUISVILLE.

Messrs. Geo. H. Hull & Co., under date of May 25, write us as follows: The demand for all grades is light, and prices are without change. The usual time, 4 mos., is allowed on the quotations below:

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal	$21.00 @ 22.00
No. 2 " "	18.00 @ 20.00
No. 1 Southern, Charcoal	18.50 @ 19.00
No. 2 " "	17.50 @ 18.00
No. 1 Hanging Rock, Stonecoal and Coke	19.00 @ 20.00
No. 2 Hanging Rock, Stonecoal and Coke	18.00 @ 19.00
No. 1 Southern, Stonecoal and Coke	18.00 @ 19.00
No. 2 " "	17.00 @ 18.00
"American Scotch"	19.00 @ 20.00
Silver Gray	16.00 @ 17.50

MILL IRONS.

No. 1 Charcoal, Cold-short and Neut'l.	16.00 @ 17.00
No. 1 Stonecoal and Coke, Cold-short and Neutral	16.00 @ 16.50
No. 2 Stonecoal and Coke, Cold-short and Neutral	.... @ 16.00
No. 1 Missouri and Indiana Red-short.	20.00 @ 21.00
White and Mottled, Cold-short and Neutral	14.00 @ 15.00

CAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast	32.00 @ 34.00
Alabama and Georgia, Cold-blast	25.00 @ 31.00
Kentucky, Cold-blast	25.00 @ 30.00

Messrs. W. B. Belknap & Co., Iron and Steel Merchants, Louisville, Ky., under date of May 27, report: Fairer weather and slightly better trade in goods for immediate consumption. The inquiry for light sheet is beginning, principally for refined. Bar Iron continues demoralized by the failure of an up-river mill and unhealthy rumors regarding others whose product is being forced on the market. This is competition not to be met in the regular way, and it tries the patience sorely. A feeling of distrust is probably on the increase in consequence of political uncertainties. A few business men to take the place of agitators in Congress would advance the country's welfare immensely. Mills about Cincinnati think the situation would improve were there a low stage of water to shut out Pittsburgh, which has commanded uninterruptedly now for two years the lowest rates of transportation westward. This would hardly, however, contribute to a general revival. The advance on Screws and Philadelphia Bolts is encouraging to a limited extent. The word "plates" in last sentence of last week's report should have read "plants," our object being to call attention to the fact that Southern Iron plants were suffering from the general depression as well as those further north.

CINCINNATI.

Messrs. E. L. Harper & Co. (successors to Messrs. L. R. Hull & Co.), under date of May 25, write us as follows: The market has been a little quiet during the week past, buyers having to a certain extent anticipated present wants by considerable purchase made during the last month and the first part of this one. The market does not manifest any more firmness in prices, and while quotations are lower than they have been before during the present long decline there is nothing on which to base the hope of an improvement at least before fall. Quotations are to a certain extent named, and parties whose credit is undoubted can generally obtain concessions by making direct offers.

HOT-BLAST FOUNDRY.

Hanging Rock, No 1, Charcoal	$22.00 @ 22.50
" No. 2, "	20.00 @ 20.50
" No. 1 Coke	18.00 @ 19.00
" No. 2 "	16.00 @ 17.00
" No. 1, Stonecoal	18.00 @ 19.00
Virginia, No. 1 Coke	19.00 @ 20.00
" No. 2 "	18.00 @ 19.50
Ala. and Tenn., No. 1 Charcoal	19.00 @ 19.50
" " No. 2 "	18.00 @ 19.50
Shawnee, No. 1 Stonecoal	18.50 @ 19.00
" No. 2 "	17.00 @ 17.50

FORGE IRONS.

Hanging Rock No. 1 Charcoal	18.50 @ 19.00
Hanging Rock No 1 Coke	18.00 @ 18.50
Virginia, No. 1	18.00 @ 18.50
Ala. and Tenn. No. 1 Charcoal	18.00 @ 18.50
Red-short, No. 1 Coke	19.00 @ 20.00
Cold-short, No. 1 Stonecoal	16.00 @ 16.50
Old Rails, prime	cash, 19.00 @ 20.00

CAR WHEEL AND MALLEABLE.

Hanging Rock	31.00 @ 35.00
Southern and Western Brands	28.00 @ 30 00

ORE.

Virginia Hematite (Washed)	cash, 4.25 ℔ . ..

FOREIGN.

FRANCE.

(*Moniteur des Interets Materiels.*)

Paris, May 12, 1878.—*Metals.*—We can but report favorably as regards business in general, but as metals are suffering from causes of a more special nature, both in France and elsewhere, they are slow in responding to the otherwise more encouraging aspect. *Copper.*—The world's production has evidently run ahead of consumption, and of speculation there is none as long as the possibility of war still lurks behind the scenes. We have been quiet here, and quote the market as follows: Chili Bars deliverable at Havre, 170 francs the 100 kilos; Common ditto, 165; Ingots, 170; Tough Cake, 173.75; Best Selected, 175, and pure Corocoro Ore. 175. Havre remains steady. First brands Chili Bars there, 165 @ 166.25; good current ditto, 162.50; and Lota and Urmeneta, 161.25. Marseilles is quiet and unaltered. They quote as follows: Spanish, in slabs, 157.50; Red Tokat, 160 @ 165; small Refined Ingots, 175; Bolts, 195; Sheathing, 190, and Yellow Metal ditto, 170. *Tin.*—Whenever the supplies from one quarter abate a little, there are increased shipments from another, and as the deliveries are no larger the metal is statistically worse off every month. The market here has

been upheld with difficulty. We quote Banca, deliverable at Havre, 180 francs the 100 kilos.; Billiton, 171; Straits, 170; Australian, 167.50, and English at Havre or Rouen, 167.50. Marseilles is quiescent. They quote Straits 165; Billiton, 170; English Refined, 180, and Banca, 177.50. It had been confidently hoped that the decline in *Lead* would at length have been stayed, but to our regret this has not been the case, at least not in England, and we are correspondingly weak here. We quote the range 42 @ 43 francs the 100 kilos., while Soft, at Marseilles, remains nominally 40.75, and Sheet and Pipe, 46.75. Havre quotes Spanish 43 @ 44. *Spelter.*—Although not as unfavorably situated as the preceding metals, it is also ill-sustained. We are inactive and weak here, and quote Silesian 47.50 @ 48.50 francs the 100 kilos. Marseilles still quotes Sheet Zinc 60 @ 62, and old Remelted, 43. *Iron.*—Merchant Iron here is still in a bad way, and may be obtained here, delivered at the depot, at 157.50 francs, which leaves the maker but 147 francs at the works. Even at this low figure consumers show little inclination to anticipate requirements. In the Haute Marne the tendency as regards special Iron has rather improved, and remunerative prices are now being realized in that locality. Pig Iron is, however, in less request there, and No. 3, second fusion, is selling in moderate quantities at 85 francs; affinage is bringing 107 @ 110. Forges in the Franche-Comte are reducing their output 50 %, hoping thus to weather an unpropitious period. Merchant Iron there sells slowly at 170 @ 180 as to quantity. Hard and hollow ware is selling better. In the Ardennes there is not much activity displayed just at present; orders are not plentiful, and the stock begins to accumulate. At the North there seems to be no remedy left but to cut down expenses to the utmost, and the various works are actively competing for the few orders dropping in. In the Meurthe and Moselle Pig Iron has remained steady, but the demand is languishing and the supply slowly increases. There was a rumor in the district at latest dates, that important commands for railroad material had been received from Russia. *Coal.*—The absence of buoyancy in the Iron regions of France keeps Coal in an unfavorable plight; the output has to be checked, expenses have to be reduced, the Anzin Company taking the lead in this respect, and contemplates a lowering of wages, we understand, by 10 %.

BELGIUM.

(*Revue Universelle*).

BRUSSELS, May 12, 1878.—*Iron.*—Want of activity has been the main characteristic of the week. Iron prices are heavy. The only thing still doing is the filling of remnants of old orders; new contracts there are none making. In default of something better our Iron masters are falling back on government adjudications, and competition to obtain awards is very great. At an adjudication for 1000 yards of gas pipe at Termonde the lowest offer made was at the ruinous figure of 12.95 francs the 100 kilos. for tubes of various diameters. On the 22d inst. there will be an opening of tenders here for the furnishing to the State of some post-office railway cars, together with other minor vehicles for rolling stock. The Grand Central Railroad Company of Belgium has just published its statement for 1877. The share of expenses accrued to each department has been the following: Wages to the men in the depots and shops, 6 %; repairs, 1 %; water, 2 %; salaries to engineers and firemen, 17 %; coal, 31 %; lubricating oil, 4 %; petty expenses, 2 %, and replenishing rolling stock, 37 %. Each locomotive has run double the distance it did in 1865. The engineers of Liege and Ghent have abandoned the plan of opening an office of information at the Paris Exhibition. Mr. A. Brasseur, engineer, will publish a work there in octavo, of 500 pages, having reference to Belgian industry, and containing a directory of leading Belgian firms engaged in manufactures. *Coal* is inactive; stocks increase, and production will have to be curtailed.

GERMANY.

(*Borsenhalle*).

HAMBURGH, May 11, 1878.—*Metals.*—We take pleasure in stating that the crops in Germany look promising, and that there is thus a favorable basis for a good consumptive demand for all sorts of commodities, provided drawbacks of a political nature do not interfere and thwart the otherwise rather encouraging aspect. Stocks of metals in the hands of consumers and the trade are moderate, prices are low and the money market is easy. A revival in the demand may, therefore, be looked forward to with some confidence ere midsummer intervenes. *Copper* has been generally quiet, and prices have just held their own, and no more. No change here or at Stettin. Berlin quotes: English and Australian, 71 @ 72 marks the 50 kilos., and Mansfield, 74.75 @ 75. Very little has transpired in *Tin*, which has to be put down as decidedly weak, although nominally unchanged here, at Berlin and Stettin. *Lead.*—Sales are effected very slowly, and prices are feebly sustained all over Germany, especially here and at Stettin. Berlin quotes: Tarnowitz, Hartz and Saxonian, 17 @ 17.25 marks the 50 kilos. *Spelter*, although inactive, has, on the whole, been steady. No alteration can be reported from here and from Stettin. Berlin quotes: Silesian, 18.50 @ 19 marks the 50 kilos.

HOLLAND.

(*Koch & Vlierboom.*)

ROTTERDAM, May 14, 1878.—*Tin* is dull. Banca has sold at 39.25 guilders the 50 kilos. The asking price for Billiton is 37.50. The third sale of Banca Tin by the Netherland Trading Society will be held on the 28th inst. when there will be offered 20,100 slabs Banca.

EAST INDIES.

(*Schmidt, Kustermann & Co.*)

PENANG, April 6, 1878.—*Tin.*—Purchases for Europe have been less active in view of the threatening political outlook. The low quotations cabled from London have also produced a lull. Sales for the week sum up 4540 piculs. Prices have given way gradually from $18.05 @ $17.85 ℘ picul, closing firmly at the inside figure. Stock in bazaar, 4000 piculs.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(*From our Regular Correspondent.*)

LONDON, ENG., May 14, 1878.

THE POLITICAL SITUATION,

which naturally governs the business outlook, is now believed to be considerably brighter and more pacific than was the case a week ago. This better state of feeling has to a great extent arisen out of the journey of Count Schouvaloff from this capital to St. Petersburg. The public press appear to be what is commonly called "cock sure" about the peaceful opening afforded by this incident, but it appears to me that their gratulatory writings may prove to be a little premature. Certainly nothing I have seen in any quarter has been sufficiently positive or definite to give any real and tangible ground for supposing that the Count's mission is clearly intended to avert further misunderstandings between this country and Russia. Everybody hopes that such may be the case, yet there have been so many "slips" that we fear even yet to count our chickens lest the hatching thereof should result in another miserable addling.

THE PRIVATEERS ON YOUR COASTS

in the meantime continue to excite some attention, but no alarm. People seem to recognize nothing to be afraid of in the idea, but rather appear disposed to set down the whole thing as being a somewhat clumsy device on the part of Muscovite diplomatists, purposely played off in order to draw off attention from their "little games" in Eastern Europe. Anyhow the ship owners don't appear to be greatly alarmed, for during the past few days freights from South Wales and elsewhere for coal and iron &c., have been reduced by 1/6 and 2/ per ton.

VARIOUS OPINIONS

continue to be held and expressed as to whether trade in iron, steel and hardware is really reviving, or the contrary. Those who argue affirmatively have good grounds for their theory in the shape of the exceedingly marked improvement set forth by the Board of Trade returns for the month of April (as fully detailed by me last week), while their opponents allege that the better condition of the foreign business is fully or more than fully discounted by the dreadful dullness of all the home markets. There may, it is true, be something in both these ideas, but the impression in my own mind is that there is a decided alteration for the better, yet that manufacturers are finessing by concealing all they know lest it should lead their workpeople to renew agitations for higher wages or shorter hours. Presently this "dissembling" will not be possible, but a start will have been secured which will be of great service to all who have had its benefit early in the struggle. The

AMERICAN COMPETITION,

of which so much has been written during the past few years, is still a subject of newspaper discussion in this country, and may very well continue to be so with not a little advantage to manufacturers on both sides the water. Writing on the question, however, the smart Birmingham correspondent of the *Ironmonger* handles the "Central England" man of your Pittsburgh contemporary rather roughly. He says, to use his own words: "Some amusement has been caused this week among the nail and tack manufacturers of Birmingham by the bombastic and misleading reports of the progress of American competition here, published by the *American Manufacturer* from 'their special correspondent in Central England.' According to this imaginative gentleman, no article of English manufacture suffers so much in the comparison with American goods as 'the barbarously-shaped and completed nail of England' beside the 'splendid Pittsburgh nails;' and 'the English tacks are as bad as the English nails; they are ugly and they are blunt,' whereas 'the Pittsburgh tacks are like the Pittsburgh nails; they are pretty and they are sharp—sharp almost as the point of a needle,' and, as a consequence, Pittsburgh tacks are selling here.' The writer is mistaken. Neither Pittsburgh nails nor Pittsburgh tacks have any footing in the English market, for which their patterns and their prices are alike unsuited; but large quantities of English-made tacks and rivets are exported to the United States, and some American manufacturers are even getting rivets made here to their own patterns, and importing them in their own printed wrappers as American-made goods. There is no secret here about this business, many tons of brass shoe rivets for the American market being turned out weekly—among others, by Mr. Turton, of Great Tindal street. It is odd, if the American goods are so superior to those of English make, that the American makers should give out their orders to be executed in this country."

SCOTCH PIG IRON

has been dull and lifeless throughout the entire week. In some quarters an impression is beginning to prevail that Scotch Pig is being ousted from many foreign markets, where it has long had a large sale. On the other hand, new openings are being found for its consumption in Australia and other of the British colonies. There are now 174,292 tons in Connal & Co.'s public stores, besides stocks in makers' hands. At this date last year Connal's warehouses held 135,359 tons. The total shipments to date this year exhibit a falling off of 15,527 tons from the same period of 1877.

James Watson & Co. report: "During the past week the Iron market has been very dull with a limited business doing. Monday being a holiday there was no market held. On Tuesday it opened at 49/8 and declined to 49/5 per ton. On Wednesday business was done at 49/5 and 49/5½ cash, also 49/6 14 days, while yesterday it was steady from 49/4½ @ 49/6 cash, and 50/ three months. To-day the market is firmer, business being transacted at 49/6 and 49/7 cash, closing buyers at the former figure and sellers at the latter." We quote:

	No. 1.	No. 3.
G. M. B., at Glasgow	50/	49/
Gartsherrie, "	57/6	53/
Coltness, "	61/	54/6
Summerlee, "	57/	51/
Langloan, "	58/6	52/6
Carnbroe, "	52/	50/6
Calder, at Port Dundas	56/6	50/
Glengarnock, at Ardrossan	56/6	52/
Eglinton, "	50/6	49/6
Dalmellington, "	50/6	49/6
Shotts, at Leith	59/	55/6
Kinneil, at Bo'ness	54/6	51/

John E Swan & Bros., Limited, and Wm. Colvin & Co.'s reports coincide with the above.

Last weeks shipments from The Clyde included these: Trinidad and Demerara—sugar-making machinery, £3338; 80 tons wrought iron tubes, £414; 1½ tons iron castings, £26. Adelaide—machinery, £80; 9¾ tons wrought iron rivets, £113; 120¾ tons iron castings, £979; 20¾ tons galvanised iron, £323; 4¼ tons wrought-iron tubes and fittings, £62; wrought iron, £22. Antwerp—machinery, £150; 10 tons wrought iron, £171; sewing machines, £592; 2 tons wrought-iron tubes, £45. Valencia—203 tons iron castings, £1670; sewing machines £1000. Mediterranean—195¾ tons iron castings, £1881; iron plates, £20; sewing machines, £1513; 5 tons wrought-iron tubes, £75; unenumerated iron and steel manufactures, £165. Savanilla and Barranquilla—machinery, £152; one iron barge, £380; hull of iron steamer, £2935. New York—machinery, £179; 4 tons iron castings, £91; 1¼ ton malleable iron tubes, £33. Mauritius—7¼ tons boiler tubes and fittings, £172; sugar-making machinery, £3412; 70 tons malleable iron, £514; 24¾ tons iron castings, £315; steam boilers and fittings, £2175; 2 locomotive engines and fittings, £1400. Rio de Janeiro—2269 tons iron castings, £12,442. St. Nazaire and Bordeaux—sewing machines, £550; 4¾ tons wrought iron, £96. Gothenburg—2¾ tons iron castings, £54; 12¼ tons wrought iron tubes, £147. Jamaica—7 tons iron castings, £82; ½ ton hoop iron, £4. San Francisco—machinery, £4750. From Greenock: Trinidad—agricultural machinery, £13. Havana (*via* Liverpool)—cast-iron pipes, £96; iron castings, £396.

THE ELECTRIC LIGHT

is at length beginning to excite a good deal of close attention, so that the invention bids fair to presently pass out of the realms of speculation into that of actual accomplishment. Already I hear of tests with it on a large scale both in this country and in France. The Hotel de Louvre and other large buildings in Paris are nightly illuminated by it, while at Stockton Messrs. Head, Wrighton & Co's iron works are having it in use, and at Manchester a large cotton factory is being fitted with its appliances. To illustrate what effect this sort of progress may have shortly, I may say that in several towns and cities the shares of Gas Companies are going down in value.

AT SHEFFIELD

there does not appear to be much new business in hand, yet one or two of my friends there tell me that they are in receipt of a better class of orders for steel of various kinds, and that some of these favors are from markets—colonial and foreign—whence no such indents had ever previously emanated. I think I am violating no confidence when I state that one of these newer customers is India, which is taking much larger consignments of steel files and tools than at any former period of its history. To Egypt also considerable shipments are being effected, and other parts of that *terra incognita*—the Great African continent—are being most inquisitorially looked after. My information also leads me to the conclusion that many of the Sheffield houses, especially the older concerns, might do much more business if they would abandon the nowadays absurd practice of adhering rigidly to their price lists. The quotations of a few years back may do very well for a few choice old brands for special purposes, but will not pay in the general run of trade. It is an ostrich-like policy to adhere to these high figures, which must yield profits of 30 to 50 per cent., while newer prices at home and active competitors in America and on the Continent are so eagerly attracting all the customers they can secure. Some of the better known Sheffield steel manufactures are at this moment void of orders simply because they uniformly decline them except at their full and stereotyped list prices. In the sheep-shear trade some of the workmen have caused "a bother" by offering opposition to the introduction of machinery by Mr. Ward (Ward and Payne) for grinding the common goods produced for South America, but the men are now, it is stated, likely to be defeated by the vigorous action of Mr. Ward, that gentleman having threatened to remove his business to another town; this seems likely to win the struggle. In cutlery most of the older houses are doing a very good turnover, much of it on account of your markets—particularly for the South.

STAFFORDSHIRE AND BIRMINGHAM

are a little better engaged in respect of almost all the better classes of sheet iron, bars, plates, and galvanizing qualities. The government requirements have something to do with this retention of briskness, but in other respects stronger necessities have been put forward, with the result which I have indicated. All the official list figures have not changed, but it "goes without saying" that current competition has so materially enlarged individual discounts that it is practically impossible to say at what prices the sales of the day are being transacted. In fact, as a friend reminded me the other day, discounts and list prices were invented simply to "bother" customers and to keep each of them and other makers in the dark as to the actual doings of competitive producers. The hardware industries are for the most part steadily engaged, albeit none of them are thoroughly busy. By the spring reopening of the Baltic a goodly current of business has been diverted to Northern Europe, while the better prospects of peace have caused some few speculations to be entered into for the Levantine and Turkish markets. It is also reported that the demand from Australia and New Zealand is on a stronger scale than for some time past, and that considerable lots of miscellaneous wares are going to the West Indies, Australasia and parts of South America.

SOUTH WALES AND MONMOUTHSHIRE

are quiet as regards iron, but at Dowlais, Ebbw Vale and Tredegar, as well as at Landore and Rhymney, there is a fair production of steel. The Plymouth and Aberdare works and collieries are stated to have been purchased by a syndicate of Scottish capitalists, who are reported to intend an early resumption of active operations. Last week's shipments of iron from Cardiff were 2065 tons, and from Newport, 2219 tons of rails for Bombay, consigned by Ebbw Vale. The tin plate restriction movement is now said to be nearer fruition, and will probably attain the desired end in the course of a few days. The necessity for its adoption has received a practical illustration by the suspension of one of the makers with liabilities set down at £70,000.

THE METAL MARKETS

are still dull and inanimate, with prices at a lower level in almost every respect than has been known for many years past. There appears to be little or no speculation just now, a state of things which may, in part, be attributed to the apparently more remote contingency of war. The *Ironmonger* reports as follows: "*Copper* has been quiet all the week, with a further weakness of prices all round. A sale of 500 tons Cape ores, by public tender, has realized 11/10 for 33 per cent. Of Chili bars 200 tons of Lota have been sold for distant arrival at £62. 10/; 75 tons Urmeneta at £62 cash, and 100 tons good ordinary brands at £61 17/6 @ £61. 10/ ditto, with small sales to-day of good ordinary brands at £60. 15/, and special marks at £61. 10/ @ £62. Charters from Chili per advices received on Friday last for second half of April were 1,800 tons, namely, 1,500 tons bars and ingots for United Kingdom, and 300 tons bars for the Continent. Australian is lower; 25 tons Burra sold at £70 cash; present quotation is £70. 10/, while Wallaroo is £72 @ £72. 10/. English has also been dull and easier; tough, $67 @ £67. 10/; best selected, £68 @ £69; but for strong sheets £73 is still asked. *Tin* is again weaker, and sellers have seemed disposed to press negotiations, with the natural result of a further drop in prices. The sales early in the week were rather over 300 tons Straits and Australian at £61. 15/ down to £60 cash, the price being afterward £61 @ £60. 10/, subsequently up to £61, and closing quiet at £60. 15/ @ £61. English has also further declined, ingots being now quoted £65 @ £65. 10, and bars £66. @ £66. 10/. The Dutch Trading Company will offer in public, on the 28th inst., about 20,100 slabs of Banca. Tin plates are, if anything, a trifle dearer, although the arrangement for restricting the output has not yet received the binding assent of the requisite majority of those engaged in the trade. *Lead* is again easier to buy, English pig being obtainable at £16, 17/6 @ £17, and soft Spanish without silver at £16. 12/6. *Spelter* has also felt the depressing influences of the market, and is held at £17. 15/ @ £18 for ordinary brands and £17. 15/ V. and S. at Swansea. *Quicksilver* unchanged, at £7 per bottle. *Antimony* quiet, at £49 @ £49. 10/ for English Star." I make the subjoined selections from the monthly Iron and Metal Circular of Messrs. Sanders Brothers of London:

Spanish Terra-Cotta Work.

The use of terra-cotta in various forms is well-nigh universal in Barcelona, and affords a striking proof of the manufacturing and creative tendencies of the Catalans. A correspondent, dating from Barcelona, says that there are in the provinces of Catalonia, so far as he has been able to ascertain, no beds of fire-clay, but on the other hand, the whole plain is one great bed of the common red clay. This is utilized to a very large extent. The red and yellow clays are worked up principally into the flooring tiles, square and hexagonal, whose employment in construction seems so universal in that part of Spain. He then continues: "I have now wandered for some time among the four provinces of Catalonia, and I have never seen a house without a flooring of tiles. In very many the ceilings are also constructed of the same materials. Between the beams the builder makes an arch or vault of these tiles, and these are subsequently covered with a thick coating of plaster, leaving a ceiling not exactly flat, but with what Ruskin would call a fine vanishing curve. In the kitchens, &c., use is made of glazed tiles of the famous stanniferous enamel, composed of equal parts of tin and lead. Generally these are of spotless white, with a row of blue tiles, in which the enamel has been covered with cobalt, at the bottom. But in very many cases these tiles are highly decorated with the few but artistic colors made famous by the majolica of Fienza, Forli and Sienna—a bright zaphara blue, a dull yellow and a vivid green. These enameled tiles, however, are not made in Barcelona, but in Valencia, for, though the Barcelonians believe the contrary, the keenest search has not enabled me to find a single establishment for their manufacture.

"It is otherwise with the flooring tiles, also used in a modified form for roofing purposes. For the construction of these there are very many establishments in the villages that crowd around the great commercial and manufacturing city of Spain, for the demand is as sure as that for bricks in our own land. In the country houses—which even those of moderate means consider necessary for a comfortable enjoyment of the Sunday leisure and rest from toil—the appreciation of terra-cotta finds a much wider scope; and accordingly in all such factories one sees not only tiles, but balustrades, vases, fountains, statues, flower stands, and a hundred other objects, partly for use, partly for ornament. The balustrades are, perhaps, the best articles manufactured in this material, for truth compels me to say that in the vast majority of instances I was disappointed with the artistic objects. The fault is not in the material, for the clay is all that can be desired, and it is not in the baking. It is in this, that it does not pay to obtain a really artistic model from a good sculptor, and hence garden statues are to art just what the figure-heads of ships are. Occasionally, no doubt, some Thorwaldsen is found carving wood for the prows of lobster smacks, and, perhaps, in Italy the young Canova may have worked at garden statues at the outset of his career. But, with the knowledge that I have been able to acquire on the subject, I have invariably found the garden statuary in terra-cotta a vile thing, devoid of beauty and of plasticity. But the balustrades, including the finial vases at the corners, are decidedly of a superior character, because the Catalans, who have an extraordinary genius for construction, have comprehended intuitively what was wanted to finish off the tops of their country houses.

"The absence of fire-clays or of any clay suitable for the purpose, has prevented the Catalans from making any attempt at crockery. Whatever of this kind is used comes either from England, France, Seville, or Valencia. There is, however, a factory of porcelain, where is made the hardware porcelain so largely employed in door-fittings. The great majority of the houses in the city are upon the flat principle, and upon each floor are two flats, one to the right and one to the left. Each of these has its door decorated with three masses of porcelain, one of which, the top one, is the broad rim of the spy-holes, through which the servant reconnoitres you and examines your appearance before opening; the next is the knob of the bell-pull, and the third is a broad plate, on which is fixed a large and long porcelain handle, for the purpose of closing the door. Almost every house in the place has the same appendages, and as, moreover, the doors in the interior have all porcelain knobs, and some rich porcelain plates, it is obvious that the consumption of hardware porcelain was sufficient to justify the establishment of a porcelain factory, though, apparently, kaolin does not exist in Spain. It was soon found that it was possible to fabricate also plates and partial services and toilet sets. But the decoration has been of so barbarous and unsatisfactory a character, that I would not have deemed it necessary to write one word of Catalan porcelain save for one fact."—*Hardware Review.*

The Metal Work of India.

The official Handbook of the British Indian Section of the Paris Exposition contains the following respecting the metal-working industries of India:

Vessels of brass and copper, dishes and bowls, *lotas*, candlesticks, images of the gods, and other mythological *emblemata*, sacrificial spoons, censers and temple bells, and other sacred and domestic utensils are made all over India; and of the same patterns as we find in representations of them on the oldest sculptures and cave paintings. The *lota* is the globular bowl, sometimes melon-shaped, with a low, narrow neck, universally used in ceremonial and other ablutions, and its name is the same word as *lotus*, the water-lily, and the Latin *lotus*, washed, and English lotion, a wash. It is found plain, and chased or graven, and encrusted. Very good brass work is made at Ahmednugger and Ahmedabad in Western India, and at Benares in Northern India; but that of Madura and Tanjore in the Madras Presidency is superior to all, and in its bold forms and elaborately inwrought ornamentation recalls the description Homer gives of the work of Sidon in bowls of antique frame. Some are simply etched and others deeply cut with mythological designs, and others are diapered all over with a sort of vine-leaf pattern, seen in Assyrian sculptures, copper on brass, or silver on copper, producing an effect often of quite regal grandeur. Castellani possesses the finest specicen known of silver encrusted on brown waxy copper. In the Prince's collection are several small Tanjore and Madura *lotas*, but none of superior excellence. The most interesting of all Indian *lotas* is one in the India Museum of about A. D. 200-300, discovered by Major Hay in 1857, at Gundlah, in Kulu, where a landslip exposed an ancient Buddhist cell in which this *lota* with others had been lying buried for 1500 years. It is exactly of the shape now made, and is enchased all round with a representation of Buddha as Prince Siddhartha, before his conversion, going on some high procession. An officer of state on an elephant goes before; the minstrels, two damsels, one playing on a flute and the other on a *vina*, follow after in the midst is the Prince Siddhartha, in hi chariot drawn by four prancing horses and guarded by two horsemen behind it; all rendered with that gala air of dainty pride and enjoyment in the fleeting pleasures of the hour which is characteristic of the Hindus to the present day, as if life were indeed

"Musical as is Apollo's lute,
And a perpetual feast of nectared sweets,
When no crude surfeit reigns."

Benares is the first city in India for the multitude and excellence of its cast and sculptured mythological images and *emblemata*, not only in brass and copper, but gold, silver, ivory and wood. In the Prince's collection are eight little brass figures from Vizagapatam, which for skillful modeling and perfection of finish, and a certain irresistible grotesqueness of expression, are the finest ever seen. They look as if the artist had been inspired by a study of Gustave Doré's illustrations of "Don Quixote." The temple bells of India are well known for the depth and purity of their note. Besides the ordinary brass, a variety is used in India like that called by the ancient *æs candidum*, which is mixed with silver, and a still rarer, like the ancient *æs Corinthium*, which is mixed with gold. The dark "bronzes" in India are not of true bronze, a mixture of copper and tin, but of copper without alloy.

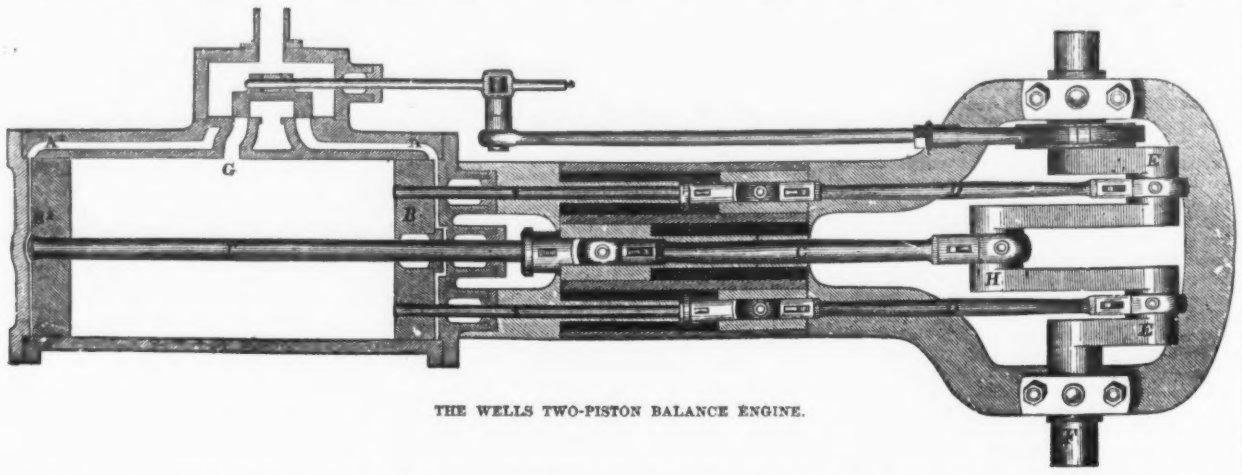
At Moradabad, in the North-West Provinces, tin is soldered on brass and incised through to the brass in floriated patterns, which sometimes are simply marked by the yellow outline of the brass, and at others by filling in the ground with some black composition.

The Proposed Change in the Patent Laws.—On March 11th Mr. Booth, by unanimous consent, obtained leave in the United States Senate to bring in "A bill to establish the Court of Patents, and for other purposes," which was read twice and referred to the Committee on Patents, before which it now is. The ostensible object of the bill is to effect such a change in the organization of the Patent Office as will operate to abolish the present system of appeals to the Commissioner in person, and from the Commissioner to the Supreme Court of the District of Columbia. Were this the sole purpose and effect of the measure, few would raise any objection to its passage. But its real object is to legislate out of office three competent and experienced officers now constituting what is recognized under the present law as a board of three examiners-in-chief, and to provide for the appointment, under the proposed law, of "three judges," to constitute a tribunal within the Patent Office, and to be known as the "Court of Patents." This court is to perform precisely the duties now performed by the examiners-in-chief, at salaries aggregating $6000 per annum less than the new bill proposes to pay the judges of the new Patent Court. The effect of this bill, should it become a law, would be: 1. Unnecessarily to increase the expenses of running this Bureau of the Interior Department. 2. To substitute for experienced officers, trained to a thorough understanding of the intricate questions involved in patent cases and removable at any time for cause, three judges who are to hold office for life, no matter how incapable any of them may prove to be.

Cement for Kerosene Lamps.—The cement commonly used is nothing but plaster of Paris. But this is porous and quickly penetrated by the kerosene. Another cement is highly recommended which has not this defect; it is made with three parts of resin, one of caustic soda, and five of water. This composition is mixed with half its weight of plaster of Paris It sets firmly in about three-quarters of an hour. It is said to be of great adhesive power, not permeable to kerosene, a low conductor of heat, and but superficially attacked by hot water. Zinc white, white lead, or precipitated chalk may be substituted for the plaster, but they harden more slowly.

The Wells Two-Piston Engine.

The great advantages of high piston speed are being more and more recognized by engineers and engine builders, and the tendency is toward designs by which it may be attained. It permits a better utilization of steam by reason of decreased condensation, and the high speed of the crank shaft in many cases makes a saving in the expense of intermediate gearing possible, while at the same time the size of the engine for a given power is very much reduced. High speed, however, can only be attained with good workmanship and counterbalancing. The illustration, which is a section of the Wells two-piston engine, shows a method by which very perfect balance of the reciprocating parts has been obtained without the use of counterbalance weights. The notable feature of the engine is the adoption of two pistons and the modification of details which this disposition calls for. The one, B^2, is provided with one piston rod, which by means of the connecting rod C moves the crank, H, while the second piston, B, possesses two rods, each of which acts upon a crank, E. The two pistons move in opposite directions, the steam entering simultaneously behind both through the steam ports A A^2, and forcing the pistons toward the center. Steam is then admitted through G, and both the pistons return to their original position, one revolution being thus finished. The slide valve shown in the illustration is used only for the smaller engines; for the larger sizes the steam chest is carried to the ends of the cylinder, in which any valve gear to which preference may be given can be used. This arrangement, as it reduces the stroke of piston by one-half, permits the connection rod to be shortened very considerably, diminishing the size, the weight and the cost of the bed-plate, the only disadvantage being the multiplication of the stuffing boxes and the more complicated nature of the crank shaft. The greatest advantage which this arrangement of parts confers upon the engine is the complete balancing of the strains which in the common form of engine tend to force the crank shaft to and from the cylinder. The balance of strains in this engine is so perfect that we have seen one of them run at a very high rate of speed with both caps removed from the pillow block. There appeared to be no tendency whatever to jump from the bearings. The inventor and manufacturer is Mr. Justin R. Wells, 86 and 88 Liberty street, N. Y.



THE WELLS TWO-PISTON BALANCE ENGINE.

The English Japan Trade.

The *Ironmongers' Review* has a long and interesting article on the subject of Japanning, from which we take the following:

The antiquity of the art of Japanning, as practiced in this country, is a matter which cannot be definitely and satisfactorily settled. One hundred and thirty years is as far back as it can be traced with any degree of certainty. References to Japanned goods are to be found plentifully strewn over the literature of the Augustine era, antedating the period we have fixed above by 30 or 40 years; but these references are misleading, and it must not be supposed that because Addison, in his essay on "A Lady's Library," mentions "a little Japan table," and Pope, in his mock heroic poem, "The Rape of the Lock," in the breakfast scene, says:

> "On shining altars of Japan they raise
> The silver lamp,"

these articles were the productions of English workmen. The fact is, we had opened a small trade with Japan 100 years before Queen Anne's time, and had imported considerable quantities of its lacquered wares. These Japanned goods, which have been made in that country ever since the eighth century, were made of wood of a peculiarly light and easily workable nature, and lacquered over with the sap of a tree called "urishi," capable of receiving a brilliant polish under the friction of the hand; and it was not until the rage for such articles assumed the proportions of the "china mania" of the same period that English manufacturers began to consider the advisability of themselves meeting the demand. It is believed on good grounds that the Japan trade was first introduced into Pontypool, and that the goods were originally denominated "Pontypool ware." It could only have been started there a year or two, however, before it was introduced into the midland district; the three great seats of the trade, as accurately as can be ascertained, commencing in the following order: Birmingham in the year 1741, Bilston in 1745, and Wolverhampton in 1748, each of them starting with, and retaining, a celebrity for special classes of goods. The early Japanners, as may be supposed, worked upon different materials from those now employed. Like the Japanese their first articles were made of wood lacquered and varnished, and it was for the manufacture of "lacquer" and "varnish" more than for the artistic application of them that Pontypool was celebrated. Small square tea trays, wooden snuff-boxes, and snuffer-stands, ornamented with imitations of Japanese screens and cabinets, were the first productions of the Japanners. Wood was soon found to be unsuitable for scores of articles to which it was seen the art could be applied, and a substitute of a softer kind was invented. This was a sort of papier mache, and the early Japanners worked upon this material years before the date of Clay's patent for papier mache in 1773. It was, therefore, as an improver of an old material rather than as an inventor that Henry Clay is entitled to honor. The Japan trade did not assume its present importance, with regard to the infinite variety of the articles manufactured until repeated improvements had been made in the manufacture of sheet iron and tin plate; but when the necessary smoothness and flexibility had been secured the development of the Japan trade was marvelously rapid. From such simple articles as snuff-boxes and snuffer-stands, the Japanner turned to toilet sets, cash-boxes, baths of all descriptions, coal vases, cups, cans, trays and waiters of the most fanciful shapes and of all sizes, sandwich cases, traveling trunks, garden engines, and multitudes of other useful articles, to barely enumerate which would fill several columns. The earliest of patterns in use among Japanners, as we have incidentally mentioned, betrayed the origin of the trade itself; but the fluctuations of taste in the matter of ornamentation are a little remarkable, and the rage for the Greek pattern in pottery architecture and Japanned goods which has been evinced during the last few years is but a revival of a similar taste which prevailed in 1765. The period between 1760 and 1800 was noted for the prevalence of "motto" patterns. These were of three kinds, and it is worthy of notice that they represented three prominent characteristics of the English people—patriotism, heroism and bachanalianism. In the first class the patterns may be represented by the following: 1. A crown and crossed swords (for tea-tray), with the royal initials and the motto, "Rule mighty George, the muses still shall sing, and hail the glorious day that made thee king." 2. A crown and cushion (for circular tray), with the motto, "England glories in the King and Queen, September 23, 1761." In the second class the following examples may be taken as representative: 1. A man-of-war in full sail, with the motto, "England's glory." 2. Two ships, after action, one towing the other, which is disabled, and both having the English colors flying, with the motto, "May Clarence ever reign triumphant over the enemies of his country." 3. A group of sailors sitting on casks on the sea shore drinking, with the motto, "British bulldogs." In the third group the following were typical: 1. A man sitting at a table holding a glass of wine to the light, with the motto, "Wine is the nectar of the gods." 2. Two long pipes crosswise, and a full glass, with the motto "Be merry and wise." The prevalence of these absurd "motto" patterns was clearly not owing to the poverty of the designers of those days, as we shall presently find, but to the prevailing tastes of the day. The period which succeeded (1800 to 1830) was the palmiest in the history of this interesting trade. It was then an art in which some of the best artists received their training. The simplest articles produced had lavished upon them the genius of the true painter, and small boxes for snuff or tobacco were painted so exquisitely with figures or landscapes that all that now remain are preserved as objects of admiration and beauty. We have in our possession specimens of this period painted by Edward Bird, R. A., Moses Horton, Franks, and others, which, compared with the value of the objects they adorn, may be said to be like "gems in an Ethiop's ear." A set of trays would then fetch five guineas, and many of these productions are now adorning the walls of gentlemen's residences, properly framed, and valued at very high prices. The era of competition altered all this, and Japanning was speedily dethroned from its position as a fine art. Jennens & Betteridge, of Birmingham, were the legitimate continuators of the best interests of the trade, and the productions of such artists as Petitt and Gillman are still much valued. The character of Japan ornamentation has now undoubtedly deteriorated; but the manufacturer is scarcely to blame. The designer may design patterns of severe and classical elegance, or elaborate figure subjects, admirably grouped and drawn, but he has the mortification of seeing the cheaper and least artistic designs bought by the gross and the art patterns neglected. There is little encouragement for a manufacturer to produce art work in the face of such customers as the Turkish merchant, who offered to take 100 gross of trays of a rose pattern if the manufacturer would paint the roses green and the leaves red. So long, theretore, as customers prefer cheap and gaudy designs, Japanning is doomed to remain degraded. The principal markets for Japanned wares are Germany, Turkey, South America, the West Indies, Spain, Russia, Canada, United States and India. The German merchants buy largely of the cheaper wares, and reciprocally supply us with the cheapest ingredients, such as bronzes, metal leaf, &c., used by the Japanner. For South America and the West Indies the patterns are of the crudest and gaudiest kinds, flaming colors being more appreciated than design. The Russian market is also a cheap one, but while the bulk of goods sent are of a cheap sort to sell in the fairs of Novogorod and Moscow, a fair supply of best work in gold ornamentation finds its way to St. Petersburg and Cronstadt. For Canada and the States the goods are more for use than ornament, as is always the case with young colonies struggling against difficulties of existence, and having no time to devote to art culture. For India the class of goods is higher, principally consisting of gold work of elaborate patterns and highly polished. India work, so called, with temples, idols, elephants, &c., which was once popular, is now little in demand. The fashion of cramming every available inch of surface on trays and waiters, as represented by the "fearfully and wonderfully" painted pattern of Adam and Eve surrounded by all created beasts and birds, has gone out of date; and now trays and waiters—especially the higher classes of goods—are often without center ornaments altogether. This is a desirable improvement, but he would be a sanguine man who would predict a return of the days when Japanners were true artists and Japanning was a fine art. The Japanner has blossomed into the oil painter; but competition, with its hurry, its cheapness, and the accompanying feverish desire of money making, has sunk the trade itself into a mere mechanical one.

The Mode of Raising Cleopatra's Needle.

The London *Times* thus describes the manner in which the Egyptian obelisk is to be placed in its future position on the Thames:

The plan for raising may be very briefly described. The column will be fitted with a powerful iron jacket as near the center of gravity as is wanted, and this jacket has two massive iron trunnions, just like the trunnions of a great gun. These trunnions will rest on two wrought-iron girders of great strength, and the whole will then resemble a monster cannon on a slide without wheels. One end of the column being raised by hydraulic presses a sufficient hight, say a foot, it will be kept so raised by a powerful balk of timber slid under it. The other end will then be similarly treated, and thus, slowly but surely, it will ascend foot by foot, shored up with timber at every stage, laid in the way which will best ensure the stability of the whole structure.

The jacket, it is thought, will clip the stone sufficiently tight to hold it in when in a vertical position; but in dealing with such enormous weights and a tapering column, it is as well to err on the safe side, so Mr. Dixon has wisely decided to have a wrought-iron strap, 18 inches broad and more than an inch thick, which will pass from one side of the jacket under the base of the monolith and up again to the jacket on the other side. Thus, then, during the few minutes it will be suspended vertically before being lowered to its base, it will stand in the band as if in a stirrup, and the more its weight presses on the band, the tighter it will make the jacket grip. The column, as we have explained, will be hoisted horizontally, but when it has reached the required hight the supports under the base will be removed and the base, being slightly in excess of the rest (2½ tons), the whole stone will slowly revolve on the trunnions till it hangs directly over its appointed spot and about four inches above it. It is then simply turning on the taps of the hydraulic presses, and the column will sink into its base in about two minutes.

A small gap will be left in the center of the base, so as to enable the iron band to be removed; but when this is done and the gap filled up with granite blocks, all will be completed.

Cement.—In stopping holes in castings, or for covering scars, a cement may be made of equal parts of gum-arabic, plaster of Paris and iron filings, and if a little finely pulverized white glass be added to the mixture, it will make it still harder. This mixture forms a very hard cement that will resist the action of fire and water. It should be kept in its dry state and mixed with a little water when wanted for use. A cement for making joints in water and steam pipe, or in any work where two pieces of metal are joined together and it is desirable to make a perfectly tight joint, may be used, made of iron filings or turnings mixed with sal-ammonia. The proportions of sal-ammonia is very small; only about a half pound is used to 50 pounds of filings. This cement is mixed when wanted for use, and is driven into the joint with a cold chisel or other tool.

The Electro-Metallurgical Company of Brussels has completed a colossal statue of John van Eyck, in bronze, by the system of electro-deposition. The galvanic process occupied several months, although a thickness of but six to eight millimeters was attained. It is believed to be the largest article which has been produced by this method, being over 12 feet in hight, and is regarded as a much more perfect imitation of the model than could be obtained by casting.

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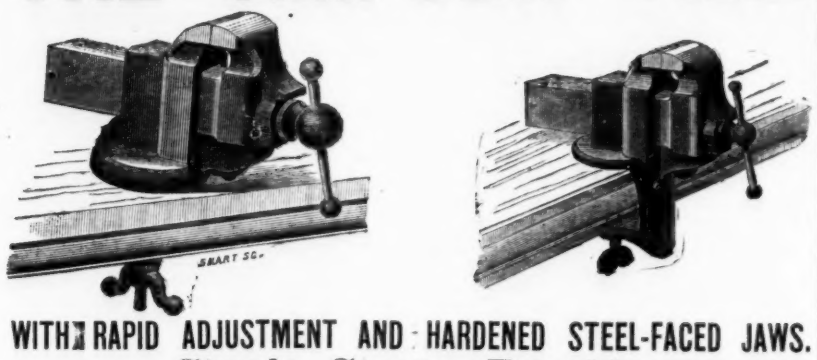

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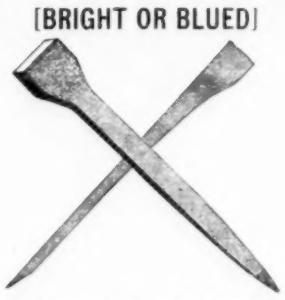

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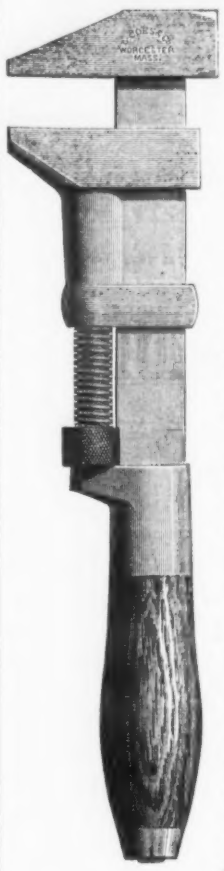

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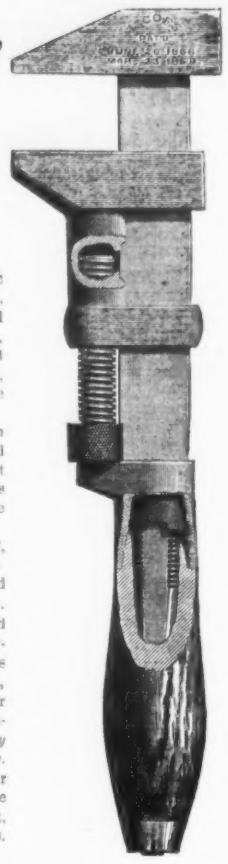

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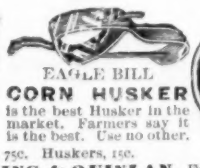

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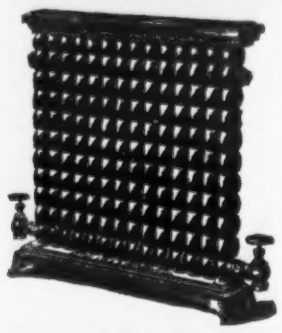

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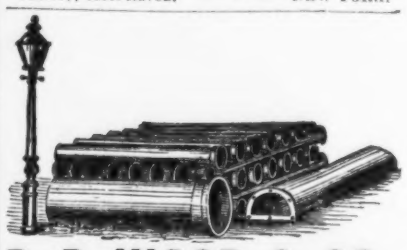

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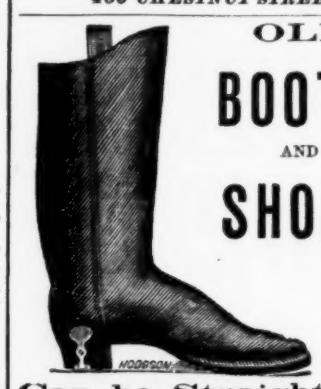

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- Bickford H., Cincinnati, O. ... 40
- Thorne, De Haven & Co., Philadelphia ... 36

Drop Forgings.
- Boker Hermann & Co., 101 and 103 Duane, N. Y. ... 20
- Rose Wm. & Bros., West Philadelphia, Pa. ... 38

Drop Presses.
- Beecher & Peck, New Haven, Conn. ... 38

Edge Tools, *Makers of.*
- The D. R. Barton Tool Co., Rochester, N. Y. ... 36
- Doscher M., 4 and 6 Gold, N. Y. ... 25

Elevators, *Makers of.*
- Crane Bros. Mfg. Co., Chicago, Ill. ... 9
- Lane & Bodley Co., Cincinnati, O. ... 39
- Mason Volney W. & Co., Providence, R. I. ... 40
- Stokes & Parrish, Philadelphia, Pa. ... 36

Elevator Buckets.
- Rivet Bucket Co., Chicago, Ill. ... 38
- Rowland F. F., Brooklyn, N. Y. ... 36

Emery Wheels.
- Lehigh Valley Emery Wheel Co., Weissport, Pa. ... 40

Engineers, Machinists, &c.
- Southern States Coal, Iron & Land Co., South Pittsburg, Tenn. ... 6
- Todd Joseph C., 10 Barclay, N. Y. ... 36

Engines, Caloric.
- Brown Caloric Engine Co., 57 Lewis, N. Y. ...

Engines (Locomotive).
- Baldwin Locomotive Works, Philadelphia, Pa. ... 4

Engines, Steam, *Makers of.*
- Ervien Chas. W. & Co., Kensington, Phila. ...
- Fitchburg Steam Engine Co., Fitchburg, Mass. ... 38
- Landis F. F. & A. B., Lancaster, Pa. ... 26
- Lovegrove & Co., Philadelphia, Pa. ... 39
- Payne B. W. & Sons, Corning, N. Y. ...

Export Factors.
- Jennings S. H., Deep River, Conn. ... 20

Faucets, Brass, *Makers of.*
- McNab & Harlin Mfg. Co., 56 John, N. Y. ... 26

Faucets, *Self-Measuring, Makers of.*
- Enterprise Mfg. Co., of Pa., Phila. and N. Y. ... 13

Felting and Wadding.
- Bacon Chas. N., Winchester, Mass. ... 19
- Titcomb C. F., Boston, Mass. ... 2

Files, *Importers of.*
- Carr J. & Riley, 82 John, N. Y. ... 32
- Fisher Joseph S., 411 Commerce, Phila. ... 11
- Frasse Peter A. & Co., 95 Fulton, N. Y. ... 8
- Moss F. W., 80 John, N. Y. ... 32
- Sanderson Bros. & Co., 16 Cliff, N. Y. ... 32

Files, *Manufacturers of.*
- American File Co., Pawtucket, R. I. ... 8
- Auburn File Works, 80 Chambers, N. Y. ... 8
- Barnett G. & H., 41 and 43 Richmond, Phila. ... 8
- Disston Henry & Sons, Phila. ... 29
- Draper C. T. & Co., Sing Sing, N. Y. ...
- Everhart James M., Scranton, Pa. ... 40
- Heller & Bros., Newark, N. J. ... 8
- Johnson & Bro., 1 Commercial, Newark, N. J. ... 8
- McCaffrey & Bro., 1732 and 1734 N. 4th, Phila. ... 8
- Paul Chas. B., Williamsburgh, N. Y. ... 8

Fire Brick, *Makers of.*
- Borgner & O'Brien, Philadelphia, Pa. ... 19
- Brooklyn Clay Retort and Fire Brick Works, Van Dyke St., Brooklyn, N. Y. ... 19
- Evens & Howard, St. Louis, Mo. ...
- Gardner, Stuart & Co., Pittsburgh ... 19
- Hall A. & Sons, Perth Amboy, N. J. ... 19
- Hall & Sons, Buffalo, N. Y. ... 19
- Maurer Henry, 418 East 23d, N. Y. ... 19
- Kreischer B. & Son, 58 Goerck, N. Y. ... 19
- Newton & Co., Albany, N. Y. ... 19
- Ostrander James & Son, Troy, N. Y. ... 19
- Valentine M. D. & Bro., Woodbridge, N. J. ... 19
- Watson John R., Perth Amboy, N. J. ... 19
- Weber Adam, 633 E. 15th, N. Y. ... 19

Flint and Emery Paper and Cloth.
- Baeder, Adamson & Co., 730 Market, Phila. ...

Flower Pot Stands.
- Barnum E. T., Detroit, Mich. ... 28

Fluting Machines.
- The American Machine Co., Philadelphia ... 34
- Weeks A. A., 82 John, N. Y. ... 13

Forges, Portable, &c.
- Keystone Portable Forge Co., Philadelphia ... 38

Fossiliferous Ores.
- Brown T. J., Rockwood, Tenn. ... 6

Foundry Facings.
- Paxson J. W. & Co., 514 Beach, Phila. ... 5
- Whitehead Bros., 517 W. 15th, N. Y. ... 28

Furnaces, *Makers of.*
- Richmond & Potts, 119 S. Fourth, Phila., Pa. ... 5

Furniture Springs.
- Carey & Moen, 234 W. 29th, N. Y. ... 3

Galvanized Iron.
- Lefferts Marshall, Jr., 90 Beekman, N. Y. ... 4

Grain Cradles.
- Grant Fan Mill and Cradle Co., Melrose, Rensselaer Co., N. Y. ... 28

Grindstones.
- Cooper & Hoile, Brooklyn, N. Y. ... 33
- Wilson & Hughes Stone Co., Cleveland, O. ... 33
- Wood H. S. & Co., 38 West, N. Y. ... 33
- Wood Walter R., 283 and 285 Front, N. Y. ... 33
- Worthington & Sons, North Amherst, O. ... 33

Guns, &c.
- Windmuller Louis & Roelker, 20 Reade, N. Y. ... 20

Gunpowder, *Makers of.*
- Kneeland F. L. (Dupont) 70 Wall, N. Y. ... 32
- Laflin & Rand Powder Co., 26 Murray, N. Y. ... 32

Hardware Commission Merchants.
- Biglin Philip S., 100 Chambers, N. Y. ... 9
- Graham & Haines, 113 Chambers, N. Y. ... 34
- Salomon L., 100 Chambers, N. Y. ... 11
- Samuel S. L., 57 Cedar, N. Y. ... 8
- Tennis & Wilson, 81 Beekman, N. Y. ... 12
- Walbridge G. B. & Co., 83 Reade, N. Y. ... 31

Hardware Dealers.
- Brower John I. & Son, 288 Greenwich, N. Y. ... 27
- Lloyd, Supplee & Walton, 625 Market, Phila. ... 33
- Shepard Sidney & Co., Buffalo, N. Y. ... 31

Hardware Importers.
- Boker Hermann & Co., 101 Duane, N. Y. ... 33
- King, Briggs & Co., 596 Broadway, N. Y. ... 11
- Van Wart, Son & Co., 134 and 136 Duane, N. Y. ... 11
- Windmuller Louis & Roelker, 20 Reade, N. Y. ... 20

Hardware Manufacturers.
- American Spiral Spring Butt Co., 82 Beekman, N. Y. ... 40
- Clark & Co., Buffalo, N. Y. ... 34
- Coulter, Flagler & Co., 87 Chambers, N. Y. ... 36
- Cowles Hardware Co., Unionville, Conn. ... 12
- Enterprise Mfg. Co., Phila. ... 13
- Hart, Bliven & Mead Mfg. Co., 107 Chambers, N. Y. ...
- Lloyd, Supplee & Walton, 625 Market St., Phila., Pa. ... 33
- Miller's Falls Mfg. Co., 74 Chambers, N. Y. ... 25
- Pratt & Co., Buffalo, N. Y. ... 31
- R. Bliss Mfg. Co., Pawtucket, R. I. ... 32
- Russell & Erwin Mfg. Co., New York ... 10
- Shepard Hardware Co., Buffalo, N. Y. ... 3
- Stanley Works, New Britain, Conn. ... 3
- Union Mfg. Co., 99 Chambers, N. Y. ... 7
- Van Wagoner & Williams, 82 Beekman, N. Y. ... 40

Hardware Specialties.
- Shepard Sidney & Co., Buffalo, N. Y. ... 31
- Spencer & Underhill, 94 Chambers, N. Y. ... 8

Hardware (Wagon.)
- Covert E. & J. C., Farmer Village, N. Y. ... 13

Harness Snaps.
- Covert Mfg. Co., Troy, N. Y. ...

Hinges.
- Lewis, Oliver & Phillips, Pittsburgh, Pa. ... 12
- Scovill Mfg. Co., 419 and 421 Broome, N. Y. ... 28
- Stanley Works, New Britain, Conn. ... 3

Hog Ringers.
- Chambers, Bering & Quinlan, Decatur, Ill. ... 25

Hoisting Engines, *Makers of.*
- Crane Bros., Mfg. Co., Chicago, Ill. ... 9
- Mundy J. S., Newark, N. J. ... 38

Hoisting Machines.
- Harrington Edwin & Son, Philadelphia, Pa. ... 36
- Mason Volney W. & Co., Providence, R. I. ... 40

Hooks (Cotton & Bale.)
- New York Handle & Mallet Works, 456 E. Houston ... 34

Horse Nails, *Makers of.*
- Ausable Horse Nail Co., 4 Warren, N. Y. ... 8
- Champion Steel Horse Nail Co., Appleton, Wis. ...
- Globe Nail Co., Boston, Mass. ... 33
- FP Horse Nail Co., Cleveland, O. ... 33
- National Horse Nail Co., Vergennes, Vt. ... 25
- Northwestern Horse Nail Co., Chicago, Ill. ... 33
- Platt & Co., Buffalo, N. Y. ... 31
- Putnam Nail Co., Neponset, Mass. ... 33
- Stetson N. Jr., 73 Pearl, N. Y. ... 33

Horse Shoes, *Makers of.*
- Boston Rolling Mills, 17 Batterymarch, Boston ... 5
- Burden Iron Works, Troy, N. Y. ... 4
- Rhode Island Horse Shoe Co., Providence, R. I. ... 33
- Schoenberger & Co., Pittsburgh, Pa. ... 4

Hydrants, &c.
- McLean John, 300 Monroe, N. Y. ... 36

Hydraulic Jacks.
- Dudgeon Richard, 24 Columbia, N. Y. ... 36

Ice Balances.
- Forschner Chas., 41 Rivington, N. Y. ... 13

Insurance, Boiler.
- Hartford Steam Boiler Inspection & Insurance Co. ... 39

Iron Brokers.
- Boynton Geo. A., 70 Wall, N. Y. ... 4
- Etting Edward J., Philadelphia, Pa. ... 5
- Hatry A. G., Pittsburgh, Pa. ... 4
- Hazard T. D., 204 Pearl, N. Y. ... 4

Iron, Charcoal, *Warm or Cold Blast.*
- Quincy John W., 98 William, N. Y. ... 4

Iron Commission Merchants.
- Adams Hugh W., 56 Pine, N. Y. ... 28
- Lowe S. B., Chattanooga, Tenn. ... 6
- Spooner & Collins, St. Louis, Mo. ... 5

Iron, Pig, *Importers of.*
- Williamson James & Co., 69 Wall, N. Y. ... 4

Iron Dealers.
- Abeel Brothers, 190 South, N. Y. ... 4
- Bonnell, Botsford & Co., Youngstown, O. ... 5
- Borden & Lovell, 70 and 71 West, N. Y. ... 4
- Carmichael W. J., 130 and 132 Cedar, N. Y. ... 4
- Cooney Daniel F., 88 Washington, N. Y. ... 4
- Huerstel G., 99 Market Slip, N. Y. ... 4
- Fuller, Lord & Co., 130 Greenwich, N. Y. ... 4
- Harrison & Gilloon, 558 to 562 Water, N. Y. ... 4
- Jackson & Chase, 206 and 208 Franklin, N. Y. ... 4
- Judson B. F., 457 and 459 Water, N. Y. ... 4
- Kane C., Pittsburgh, Pa. ... 4
- Ogden & Wallace, 85, 87, 89 and 91 Elm, N. Y. ... 4
- Pierson & Co., 24 Broadway, N. Y. ... 4
- Pullmann J. Wesley, Philadelphia, Pa. ... 5
- Quincy John W., 98 William, N. Y. ... 4
- Richards D. W. & Co., 92 Mangin, N. Y. ... 4
- Wallace Wm. H. & Co., Albany and Washington streets, N. Y. ... 4
- Warner A. B. & Sons, 28 and 30 West, N. Y. ... 4
- Williamson James & Co., 69 Wall, N. Y. ... 4
- Whitney A. R. & Bro., 58 Hudson, N. Y. ... 4

Iron. (*Manufacturers' Agents.*)
- Levis & Kimball, Philadelphia, Pa. ... 5

Iron, *Manufacturers of.*
- Boston Rolling Mills, 17 Batterymarch, Boston ... 5
- Bradley, Reis & Co., 22 Cliff, N. Y. ... 5
- Burden Iron Works, Troy, N. Y. ... 4
- Collins H. E. & Co., Pittsburgh, Pa. ... 5
- Houdlette & Ellis, Boston, Mass. ... 4
- Kirkpatrick, Beale & Co., Pittsburgh, Pa. ... 4
- Leonard John, 450 and 451 West, N. Y. ... 4
- Oxford Iron Co., 81 Washington, N. Y. ... 4
- Phœnix Iron Co., 410 Walnut, Philadelphia ... 5
- Roane Iron Co., Chattanooga, Tenn. ... 6
- Rowland James & Co., 920 N. Delaware, Phia. ... 5
- Rowland Wm. & Harvey, Philadelphia ... 40
- Shoenberger & Co., Pittsburgh, Pa. ... 4
- Taylor & Boggis, Cleveland, O. ... 6
- The Passaic Rolling Mill Co., Paterson, N. J. ... 4
- Vulcan Iron and Nail Works, Chattanooga, Tenn. ... 6
- U. S. Iron and Tin Plate Co., Pittsburgh, Pa. ... 4
- Wason Car and Foundry Co., Chattanooga, Tenn. ... 6
- Zug & Co., Pittsburgh, Pa. ... 4

Iron, Planished Sheet, *Manufacturers of.*
- Wood W. D. Co., Pittsburgh, Pa. ... 4

Iron, Swedish, *Importers of.*
- Mitander Nils, 69 William, N. Y. ... 4

Ironware.
- Lalance & Grosjean Mfg. Co., 89 Beekman, N. Y. ... 7

Ironware (Granite.)
- St. Louis Stamping Co., St. Louis, Mo. ... 25

Kitchen Sinks.
- Magee Furnace Co., Boston, Mass. ... 6

Lanterns, *Manufacturers of.*
- Dietz R. E. (Tubular) 54 and 56 Fulton, N. Y. ... 40
- Howard & Morse, 45 Fulton, N. Y. ... 2

Lathe Dogs.
- North Selden G., Philadelphia ... 36

Lathes.
- Johnson, Jr. Israel H. & Co., Philadelphia ... 39
- Shepard H. L. & Co., Cincinnati, O. ... 38

Lawn Mowers.
- Mast, Foos & Co., Springfield, O. ... 12

Lead Pipe, &c., *Manufacturers of.*
- Bayley, Farrell & Co., Pittsburgh, Pa. ... 2

Levels.
- Disston Henry & Sons, Philadelphia ... 29

Locks, *Manufacturers of.*
- Bohannan Wilson, Broadway and Kossuth, Brooklyn, E. D. ... 34
- D. K. Miller Lock Co., Philadelphia, Pa. ... 28
- Hoyt Fred J., 733 Broadway, N. Y. ... 28
- Romer & Co., Newark, N. J. ... 34
- Smith & Egge Mfg. Co., Bridgeport, Conn. ... 8
- Stewart & Mattson, Philadelphia, Pa. ... 28
- Union Nut Co., 99 Chambers, N. Y. ... 34
- Yale Lock Mfg. Co., 53 Chambers, N. Y. ... 7

Machinery, *Makers of.*
- Bliss & Williams, 167 Plymouth, Brooklyn ... 39
- Pittsburgh Mfg. Co., Pittsburgh, Pa. ... 12
- Pratt & Whitney Co., Hartford, Conn. ... 39
- Sellers Wm. & Co., 1600 Hamilton, Philadelphia ... 39
- The Bullard Machine Co., 14 Dey, N. Y. ... 20
- Wetherell Robert & Co., Chester, Pa. ... 39

Machine Screws, *Makers of.*
- Lyon & Fellows Mfg. Co., Williamsburg, N. Y. ... 12

Machinists' Tools, *Makers of.*
- Blaisdell P. & Co., Worcester, Mass. ... 32
- Davis A. J. & Co., Newark, N. J. ... 39
- Flanders L. B., Philadelphia ... 39
- Frasse & Co., 62 Chatham, N. Y. ... 38

Malleable Iron Castings, *Makers of.*
- Hammer & Co., Branford, Conn. ... 38

Mallets.
- N. Y. Handle and Mallet Works, 456 E. Houston ... 34

Manganese.
- Pyrolusite Manganese Co., 214 Pearl, N. Y. ... 33

Measuring Tapes.
- Eddy Geo. M. & Co., 353 Classon Ave., Brooklyn, N.Y. ... 9

Meat Chopping Machinery.
- Murray Iron Works, Burlington, Iowa ... 8

Metal Dealers and Brokers.
- Crane U. O., 104 John, N. Y. ... 4
- Dickerson, Van Dusen & Co., 29 and 31 Cliff, N. Y. ... 2
- Gregg H. L. & Co., 108 Walnut, Philadelphia ... 5
- Phelps, Dodge & Co., Cliff, bet. John & Fulton, N. Y. ... 2
- Purves A. & Son, cor. South and Penn, Phila. ... 5
- Quincy J. W., 98 William, N. Y. ... 28
- Sellew R. &. Co., St. Louis, Mo. ... 2

Metal Elbows.
- Hogen Elbow Co., Cleveland, O. ... 36

Metallurgists.
- Britton J. Blodgett, 339 Walnut, Philadelphia ... 5

Metals Perforated.
- Hayes G., 71 8th ave. ... 2

Metal Roofing.
- Brass Goods Mfg. Co., 280 Pearl, N. Y. ... 2

Miners' Candles, *Makers of.*
- James Boyd's Sons, 10 and 12 Franklin, N. Y. ... 38

Mineral Lands, *Dealer in.*
- Hoskins W. A., Chattanooga, Tenn. ... 6

Mineral Wool.
- Elbers Alexander D., 26½ Broadway, N. Y. ... 5

Models.
- Burrows Wm., 99 Fulton, N. Y. ... 40
- Eberhard Geo. F. & Co., Canton, O. ... 25

Mouse Traps.
- Dietz R. E., 54 and 56 Fulton, N. Y. ... 40
- Oliver E., 106 and 108 Beekman N. Y. ... 3
- Ripley Mfg. Co., Unionville, Conn. ... 3

Mowing Machine Knife Grinder.
- Fisher Henry, Canton, O. ... 37

Nails.
- Schoenberger & Co., Pittsburgh, Pa. ... 4
- Zug & Co., Pittsburgh, Pa. ... 4

Nail Machinery.
- Coyne & Hatry, Pittsburgh, Pa. ... 4

Nickel Platers.
- Hartman John, 37½ N. Seventh, Philadelphia ... 28
- Jackson Geo. W., 21 E. 13th, N. Y. ... 28
- Wolff F. A., 59 Ann, N. Y. ... 28

Nickel Platers' Supplies.
- Colt A. T., 47 Beekman, N. Y. ... 28
- Condit, Hanson & Van Winkle, Newark, N. J. ... 28
- Zucker & Levett, 639 and 641 W. 51st, N. Y. ... 27

Night Latches.
- Many Francis, 143 Chambers, N. Y. ... 8

Norway Shapes, *Rollers of.*
- Rowland Wm. & Harvey, Frankford, Philadelphia ... 40

Note Broker.
- Gallaudet P. W., 3 and 5 Wall, N. Y. ... 6

Nut Tapping Machines.
- Howard Iron Works, Buffalo, N. Y. ... 38

Nuts, Bolts, etc., *Makers of.*
- Fuller Bros. & Co., 130 Greenwich, N. Y. ... 4
- Haskell W. H. & Co., Pawtucket, R. I. ... 34
- Lewis, Oliver & Phillips, Pittsburgh, Pa. ... 12
- Roseberry, Geo. D., Pottsville, Pa. ... 4
- Russell, Birdsall & Ward, Port Chester, N. Y. ... 40
- Shelton Co., Birmingham, Conn. ... 40
- Standard Nut Co., Pittsburgh, Pa. ... 6
- Sternbergh J. H., Reading, Pa. ... 40
- Union Nut Co., 99 Chambers, N. Y. ... 34

Oil, Lubricating, *Makers of.*
- Lester Oil Co., 81 Maiden Lane, N. Y. ... 38

Oil Stones.
- Boyd & Chase, 107th and Harlem River, N. Y. ... 33

Oil Stoves.
- Florence Machine Co., Florence, Mass. ... 6
- Pool Geo. & Sons, 70 and 72 Fulton, Brooklyn, N. Y. ... 37

Old Iron, etc.
- Gregg H. L. & Co., 108 Walnut, Philadelphia ... 5

Packing (Steam.)
- "Empire Packing." Canfield Mfg. Co., Philadelphia ... 38
- Symonds & Co., Philadelphia ... 38

Paints and Oils, *Dealers in.*
- Devoe F. W. & Co., 117 Fulton, N. Y. ...

Pans (Dripping and Bread.)
- Lewis, Dalzell & Co., Pittsburgh, Pa. ... 8

Patent Solicitors.
- Howson & Son, Phila. and Washington, D. C. ... 7
- Lenz & Schmidt, Berlin, N. W. ... 7
- Spencer A. H., 28 State, Boston, Mass. ... 7
- Stetson Thomas D., 23 Murray, N. Y. ... 7

Pens (Steel.)
- Perry & Co., Limited, 112 and 114 William, N. Y. ... 28

Picks, *Makers of.*
- Pierson & Co., 24 Broadway, N. Y. ... 2

Pipes, Fittings, etc., *Makers of.*
- Eaton, Cole & Burnham Co., 58 John, N. Y. ... 26
- McNab & Harlin Mfg. Co., 56 John, N. Y. ... 26
- Pancoast & Maule, 227 Pear, Philadelphia ... 26

Pipe Tongs.
- Browning Joseph, Philadelphia ... 35

Pipe, Water and Gas, *Makers of.*
- McNeal & Archer, Burlington, N. J. ... 6
- Wood R. D. & Co., 400 Chestnut, Philadelphia ... 26

Plane Irons, *Manufacturers of.*
- Buck Bros., Millbury, Mass. ... 11
- D. R. Barton Tool Co., Rochester, N. Y. ... 26

Planes, *Manufacturers of.*
- Bailey, Leonard & Co., Hartford, Conn. ... 40
- Bailey Wringing Machine Co., 99 Chambers, N. Y. ... 25
- D. R. Barton Tool Co., Rochester, N. Y. ... 26
- Stanley Rule and Level Co., 35 Chambers, N. Y. ... 11

Plated Ware.
- Hall, Elton & Co., 75 Chambers, N. Y. ... 11

Pliers.
- Hagstoz & Thorpe, Ledger Building, Philadelphia ... 11

Plumbers' Materials, *Manufacturers of.*
- Everhart Jas. M., Scranton, Pa. ... 40
- Carr Wm. S. & Co., 106 Center, N. Y. ... 26

Pocket Knives.
- Boker Hermann & Co., 101 Duane, N. Y. ... 11

Portable Cooker.
- Thorne G. L. & Co., 76 Warren, N. Y. ... 40

Presses, Power, *Makers of.*
- Bliss & Williams, 167 Plymouth, Brooklyn ... 39
- Merriman A. H., West Meriden, Conn. ... 39
- The Stiles & Parker Press Co., Middletown, Conn. ... 39

Pressure Blowers, *Makers of.*
- Keystone Portable Forge Co., Philadelphia ... 38

Printers.
- E. S. Dodge Printing Co., 95 Chambers, N. Y. ... 13

Pulleys, Friction.
- Mason, Volney W. & Co., Providence, R. I. ... 40
- Penfield Block Works, Lockport, N. Y. ... 26
- Providence Tool Co., Providence, R. I. ... 26

Pump Pistons.
- Sprague Wm. & Co., Philadelphia ... 39

Pumps, *Makers of.*
- Douglas W. & B., Middletown, Conn. ... 7
- Rumsey & Co., Seneca Falls, N. Y. ... 7
- Rumsey S. M. & Co., St. Louis, Mo. ... 36
- Southern Pump and Pipe Co., Chattanooga, Tenn. ... 6
- Union Mfg. Co., 98 Chambers, N. Y. ... 7

Railroad Supplies.
- Jackson & Tyler, Baltimore, Md. ... 36

Rails, Iron or Steel, *Makers of.*
- Atkins Bros., Pottsville, Pa. ... 6
- Cambria Iron Co., Johnstown, Pa. ... 5
- Cleveland Rolling Mill Co., Cleveland, Ohio ... 6
- The Edgar Thomson Steel Co., 57 Broadway, N. Y. ... 33

Railway, Car and Locomotive Forgings.
- Wilson, Walker & Co., Pittsburgh, Pa. ... 4

Revolving Scrapers.
- Revolving Scraper Co., Columbus, Ohio ... 6

Rivets.
- Grundy, Geo. C., 165 Greenwich, N. Y. ... 34
- Hoopes & Townsend, Philadelphia ... 12
- Old Colony Rivet Works, Kingston, Mass. ... 13
- Townsend W. P. & Co., Pittsburgh, Pa. ... 12

Road Scrapers, etc.
- Semple & Birge Mfg. Co., St. Louis, Mo. ... 6

Rolling Mill Machinery, etc., *Manufacturers of.*
- Moore, James, cor. 16th and Buttonwood, Phila. ... 39

Rules, *Manufacturers of.*
- Stanley Rule and Level Co., 35 Chambers, N. Y. ... 11
- Stephens & Co., Riverton, Conn. ... 37

Sad Irons.
- American Machine Co., Philadelphia ... 34
- Enterprise Mfg. Co., Philadelphia ... 13

Sand and Emery Paper, *Makers of.*
- Baeder, Adamson & Co., 730 Market, Philadelphia ...

Sash Locks.
- Payson & Co., Chicago, Ill. ... 13

Saws, *Makers of.*
- American Saw Co., Trenton, N. J. ... 37
- Boynton, E. M., 80 Beekman, N. Y. ... 40
- Disston Henry & Sons, Phila. ... 29
- Peace & Hogan, Williamsburg, N. Y. ... 37
- Wheeler, Madden & Clemsen Mfg. Co., Middletown, N. Y. ... 37

Saw Frames, Wood, *Makers of.*
- Peace Harvey W., Williamsburg, N. Y. ... 37

Scales, *Manufacturers of.*
- Brandon Mfg. Co., Brandon, Vt. ... 7
- Chattillon John & Sons, 91 Cliff, N. Y. ... 9
- Riehle Bros., 9th above Master, Phila. ... 28
- Southwark Hardware Co., Philadelphia ... 32

Scoops.
- Semple & Birge Mfg. Co., St. Louis, Mo. ... 13

Screws, *Makers of.*
- American Screw Co., Providence, R. I. ... 16 & 17
- Miles F. S., 205 Quarry, Phila. ... 12
- Philadelphia Screw Co., Philadelphia, Pa. ... 8
- Russell & Erwin Mfg. Co., New York ... 10

Screws, *Importers of.*
- Bruce Geo. W., 1 Platt, N. Y. ... 6

Screw Cutting Machinery.
- Howard Iron Works, Buffalo, N. Y. ... 38
- Wiley & Russell Mfg. Co., Greenfield, Mass. ... 38

Screw Drivers, (*Improved*) *Makers of.*
- Disston Henry & Sons, Phila. ... 29

Scythe Stones.
- Dishman F. E., New Albany, Ind. ... 33
- Pike A. F., East Haverhill, N. H. ... 28

Sewer Gas Traps.
- Buhrer S., Cleveland, O. ... 6

Shafting.
- Wood Thomas, Philadelphia ... 38

Shovels, &c.
- Hubbard, Bakewell & Co., Pittsburgh, Pa. ... 28
- Kimball Shovel Co., Baltimore, Md. ... 34
- Rowland B. & Co., Philadelphia ... 19

Shot, &c.
- Sparks Thos. W., 121 Walnut, Philadelphia ... 37

Shears (Sheep).
- Hildick A. H. & Co., 12 Warren, N. Y. ... 11

Side Spring Connecting Rods.
- Topliff & Ely, Elyria, O. ... 12

Smelting Works.
- Reeves Paul S., 760 South Broad, Phila. ... 40

Spelter.
- Manning & Squier, 113 Liberty, N. Y. ... 2

Spiral Pipe (Wrought Iron).
- Abendroth & Root Mfg. Co., 28 Cliff, N. Y. ... 35

Springs.
- Carey & Moen, 234 W. 29th, N. Y. ... 3
- Rowland Wm. & Harvey, Frankford, Phila. ... 40

Stamped and Japanned Tin Ware.
- Shepard Sidney & Co., Buffalo, N. Y. ... 31
- The Chicago Stamping Co., Chicago, Ill. ... 3

Steam Boilers.
- Firmenich J. G. & F., Buffalo, N. Y. ... 28

Steam Hammers, &c., *Makers of.*
- Dudgeon Richard, 24 Columbia, N. Y. ... 36

Steam Pumps, &c., *Manufacturers of.*
- Cameron A. S., East 23d, N. Y. ... 38
- Clayton Jas., 11 Water, Brooklyn, N. Y. ... 3
- Crane Bros. Mfg. Co., Chicago, Ill. ... 36
- Knowles Steam Pump Works, 92 Liberty, N. Y. ... 39
- McGowan John H. & Co., Cincinnati, O. ... 39
- Valley Machine Co., Easthampton, Mass. ... 36

Steam Traps.
- Albany Steam Trap Co., Albany, N. Y. ... 39

Steel Castings, *Manufacturers of.*
- Chester Castings Co., Evelina, Phila., Pa. ... 40
- Cleveland Cast Steel Works, Cleveland, O. ... 33
- Eureka Cast Steel Co., Chester, Pa. ... 40
- Flagg Stanley G. & Co., 216 and 218 N. 3d, Phila. ... 40
- Pittsburgh Steel Casting Co., Pittsburgh, Pa. ... 40

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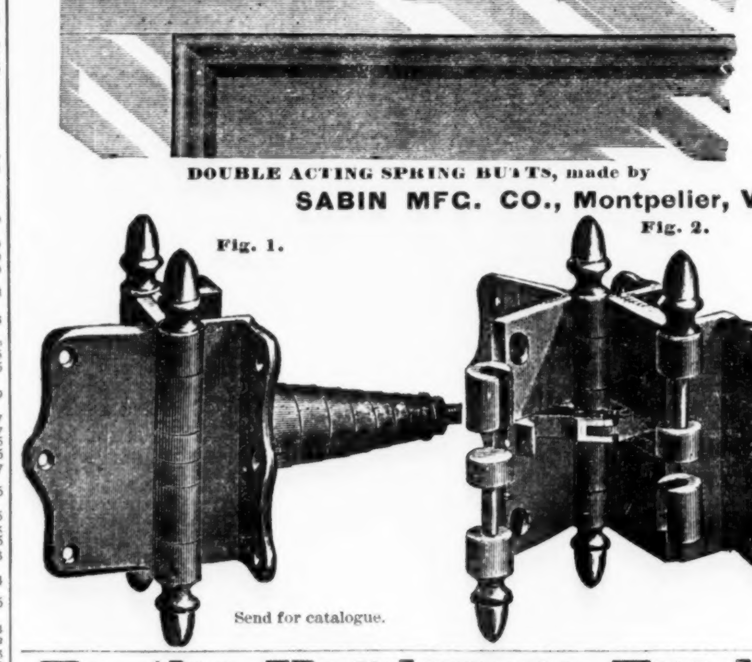

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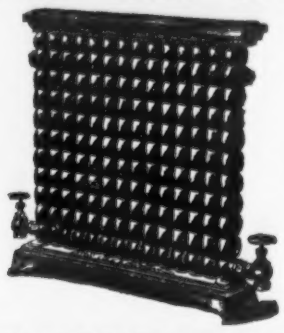

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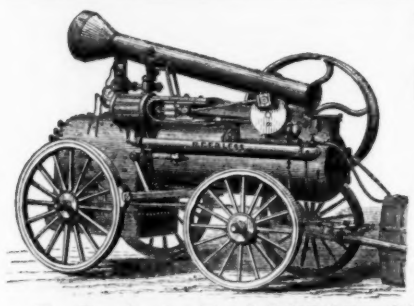

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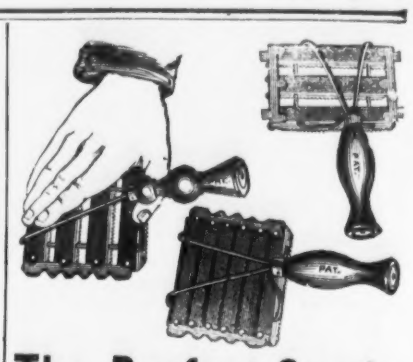

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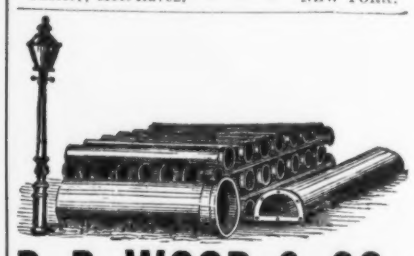

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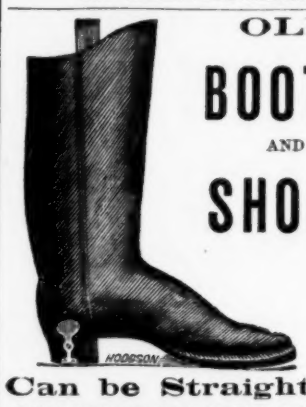

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Rivet Bucket Co., Chicago, Ill ... 38
Rowland F. F., Brooklyn, N. Y ... 36

Emery Wheels.
Lehigh Valley Emery Wheel Co., Weissport, Pa ... 40

Engineers, Machinists, &c.
Southern States Coal, Iron & Land Co., South Pittsburg, Tenn ... 6
Todd Joseph C., 10 Barclay, N. Y ... 36

Engines, Caloric.
Brown Caloric Engine Co., 57 Lewis, N. Y ...

Engines (Locomotive).
Baldwin Locomotive Works, Philadelphia, Pa ... 4

Engines, Steam, *Makers of.*
Ervien Chas. W. & Co., Kensington, Phila ...
Fitchburg Steam Engine Co., Fitchburg, Mass ... 38
Landis F. F. & A. B., Lancaster, Pa ... 26
Lovegrove & Co., Philadelphia, Pa ... 39
Payne B. W. & Sons, Corning, N. Y ...

Export Factors.
Jennings S. H., Deep River, Conn ... 20

Faucets, Brass, *Makers of.*
McNab & Harlin Mfg. Co., 56 John, N. Y ... 26

Faucets, *Self-Measuring, Makers of.*
Enterprise Mfg. Co., of Pa., Phila. and N. Y ... 13

Felting and Wadding.
Bacon Chas. N., Winchester, Mass ... 19
Titcomb C. F., Boston, Mass ... 2

Files, *Importers of.*
Carr J. & Riley, 82 John, N. Y ... 32
Fisher Joseph S., 411 Commerce, Phila ... 11
Frasse Peter A. & Co., 95 Fulton, N. Y ... 8
Moss F. W., 80 John, N. Y ... 32
Sanderson Bros. & Co., 16 Cliff, N. Y ... 32

Files, *Manufacturers of.*
American File Co., Pawtucket, R. I ... 8
Auburn File Works, 80 Chambers, N. Y ... 8
Barnett G. & H., 41 and 43 Richmond, Phila ... 8
Disston Henry & Sons, Phila ... 29
Draper C. T. & Co., Sing Sing, N. Y ...
Everhart James M., Scranton, Pa ... 40
Heller & Bros., Newark, N. J ... 8
Johnson & Bro., 1 Commercial, Newark, N. J ... 8
McCaffrey & Bro., 1732 and 1734 N. 4th, Phila ... 8
Paul Chas. B., Williamsburgh, N. Y ... 8

Fire Brick, *Makers of.*
Borgner & O'Brien, Philadelphia, Pa ... 19
Brooklyn Clay Retort and Fire Brick Works, Van Dyke St., Brooklyn, N. Y ... 19
Evens & Howard, St. Louis, Mo ...
Gardner, Stuart & Co., Pittsburgh ... 19
Hall A. & Sons, Perth Amboy, N. J ... 19
Hall & Sons, Buffalo, N. Y ... 19
Maurer Henry, 418 East 23d, N. Y ... 19
Kreischer B. & Son, 58 Goerck, N. Y ... 19
Newton & Co., Albany, N. Y ... 19
Ostrander James & Son, Troy, N. Y ... 19
Valentine M. D. & Bro., Woodbridge, N. J ... 19
Watson John R., Perth Amboy, N. J ... 19
Weber Adam, 633 E. 15th, N. Y ... 19

Flint and Emery Paper and Cloth.
Baeder, Adamson & Co., 730 Market, Phila ...

Flower Pot Stands.
Barnum E. T., Detroit, Mich ... 28

Fluting Machines.
The American Machine Co., Philadelphia ... 34
Weeks A. A., 82 John, N. Y ... 13

Forges, Portable, &c.
Keystone Portable Forge Co., Philadelphia ... 38

Fossiliferous Ores.
Brown T. J., Rockwood, Tenn ... 6

Foundry Facings.
Paxson J. W. & Co., 514 Beach, Phila ... 5
Whitehead Bros., 517 W. 15th, N. Y ... 28

Furnaces, *Makers of.*
Richmond & Potts, 119 S. Fourth, Phila., Pa ... 5

Furniture Springs.
Carey & Moen, 234 W. 29th, N. Y ... 3

Galvanized Iron.
Lefferts Marshall, Jr., 90 Beekman, N. Y ... 4

Grain Cradles.
Grant Fan Mill and Cradle Co., Melrose, Rensselaer Co., N. Y ... 28

Grindstones.
Cooper & Holle, Brooklyn, N. Y ... 33
Wilson & Hughes Stone Co., Cleveland, O ... 33
Wood H. S. & Co., 38 West, N. Y ... 33
Wood Walter R., 283 and 285 Front, N. Y ... 33
Worthington & Sons, North Amherst, O ... 33

Guns, &c.
Windmuller Louis & Roelker, 20 Reade, N. Y ... 20

Gunpowder, *Makers of.*
Kneeland F. L. (Dupont) 70 Wall, N. Y ... 32
Laflin & Rand Powder Co., 26 Murray, N. Y ... 32

Hardware Commission Merchants.
Biglin Philip S., 100 Chambers, N. Y ... 9
Graham & Haines, 113 Chambers, N. Y ... 34
Salomon L., 100 Chambers, N. Y ... 11
Samuel S. L., 57 Cedar, N. Y ... 8
Tennis & Wilson, 81 Beekman, N. Y ... 12
Walbridge G. B. & Co., 83 Reade, N. Y ... 31

Hardware Dealers.
Brower John I. & Son, 288 Greenwich, N. Y ... 27
Lloyd, Supplee & Walton, 625 Market, Phila ... 33
Shepard Sidney & Co., Buffalo, N. Y ... 31

Hardware Importers.
Boker Hermann & Co., 101 Duane, N. Y ... 33
King, Briggs & Co., 596 Broadway, N. Y ... 11
Van Wart, Son & Co., 134 and 136 Duane, N. Y ... 11
Windmuller Louis & Roelker, 20 Reade, N. Y ... 20

Hardware Manufacturers.
American Spiral Spring Butt Co., 82 Beekman, N.Y. 40
Clark & Co., Buffalo, N. Y ... 34
Coulter, Flagler & Co., 87 Chambers, N. Y ... 36
Cowles Hardware Co., Unionville, Conn ... 12
Enterprise Mfg. Co., Phila ... 13
Hart, Bliven & Mead Mfg. Co., 107 Chambers, N. Y ..
Lloyd, Supplee & Walton, 625 Market St., Phila., Pa. 33
Miller's Falls Mfg. Co., 74 Chambers, N. Y ... 25
Pratt & Co., Buffalo, N. Y ... 31
R. Bliss Mfg. Co., Pawtucket, R. I ... 32
Russell & Erwin Mfg. Co., New York ... 10
Shepard Hardware Co., Buffalo, N. Y ... 3
Stanley Works, New Britain, Conn ... 3
Union Mfg. Co., 99 Chambers, N. Y ... 7
Van Wagoner & Williams, 82 Beekman, N. Y ... 40

Hardware Specialties.
Shepard Sidney & Co., Buffalo, N. Y ... 31
Spencer & Underhill, 94 Chambers, N. Y ... 8

Hardware (Wagon.)
Covert E. & J. C., Farmer Village, N. Y ... 13

Harness Snaps.
Covert Mfg. Co., Troy, N. Y ...

Hinges.
Lewis, Oliver & Phillips, Pittsburgh, Pa ... 12
Scovill Mfg. Co., 419 and 421 Broome, N. Y ... 28
Stanley Works, New Britain, Conn ... 3

Hog Ringers.
Chambers, Bering & Quinlan, Decatur, Ill ... 25

Hoisting Engines, *Makers of.*
Crane Bros., Mfg. Co., Chicago, Ill ... 9
Mundy J. S., Newark, N. J ... 38

Hoisting Machines.
Harrington Edwin & Son, Philadelphia, Pa ... 36
Mason Volney W. & Co., Providence, R. I ... 40

Hooks (Cotton & Bale.)
New York Handle & Mallet Works, 456 E. Houston .. 34

Horse Nails, *Makers of.*
Ausable Horse Nail Co., 4 Warren, N. Y ... 8
Champion Steel Horse Nail Co., Appleton, Wis ...
Globe Nail Co., Boston, Mass ... 33
FP Horse Nail Co., Cleveland, O ... 33
National Horse Nail Co., Vergennes, Vt ... 25
Northwestern Horse Nail Co., Chicago, Ill ... 33
Platt & Co., Buffalo, N. Y ... 31
Putnam Nail Co., Neponset, Mass ... 33
Stetson N. Jr., 73 Pearl, N. Y ... 33

Horse Shoes, *Makers of.*
Boston Rolling Mills, 17 Batterymarch, Boston ... 5
Burden Iron Works, Troy, N. Y ... 4
Rhode Island Horse Shoe Co., Providence, R. I ... 33
Schoenberger & Co., Pittsburgh, Pa ... 4

Hydrants, &c.
McLean John, 300 Monroe, N. Y ... 36

Hydraulic Jacks.
Dudgeon Richard, 24 Columbia, N. Y ... 36

Ice Balances.
Forschner Chas., 41 Rivington, N. Y ... 13

Insurance, Boiler.
Hartford Steam Boiler Inspection & Insurance Co .. 39

Iron Brokers.
Boynton Geo. A., 70 Wall, N. Y ... 4
Etting Edward J., Philadelphia, Pa ... 5
Hatry A. G., Pittsburgh, Pa ... 4
Hazard T. D., 204 Pearl, N. Y ... 4

Iron, Charcoal, *Warm or Cold Blast.*
Quincy John W., 98 William, N. Y ... 4

Iron Commission Merchants.
Adams Hugh W., 56 Pine, N. Y ... 28
Lowe S. B., Chattanooga, Tenn ... 6
Spooner & Collins, St. Louis, Mo ... 5

Iron, Pig, *Importers of.*
Williamson James & Co., 69 Wall, N. Y ... 4

Iron Dealers.
Abeel Brothers, 190 South, N. Y ... 4
Bonnell, Botsford & Co., Youngstown, O ... 5
Borden & Lovell, 70 and 71 West, N. Y ... 4
Carmichael W. J., 130 and 132 Cedar, N. Y ... 4
Cooney Daniel F., 88 Washington, N. Y ... 4
Huerstel G., 99 Market Slip, N. Y ... 4
Fuller, Lord & Co., 139 Greenwich, N. Y ... 4
Harrison & Gilloon, 558 to 562 Water, N. Y ... 4
Jackson & Chase, 206 and 208 Franklin, N. Y ... 4
Judson B. F., 457 and 459 Water, N. Y ... 4
Kane C., Pittsburgh, Pa ... 4
Ogden & Wallace, 85, 87, 89 and 91 Elm, N. Y ... 4
Pierson & Co., 24 Broadway, N. Y ... 4
Pullmann J. Wesley, Philadelphia, Pa ... 5
Quincy John W., 98 William, N. Y ... 4
Richards D. W. & Co., 92 Mangin, N. Y ... 4
Wallace Wm. H. & Co., Albany and Washington streets, N. Y ... 4
Warner A. B. & Sons, 28 and 30 West, N. Y ... 4
Williamson James & Co., 69 Wall, N. Y ... 4
Whitney A. R. & Bro., 58 Hudson, N. Y ... 4

Iron. *(Manufacturers' Agents.)*
Levis & Kimball, Philadelphia, Pa ... 5

Iron, *Manufacturers of.*
Boston Rolling Mills, 17 Batterymarch, Boston ... 5
Bradley, Reis & Co., 22 Cliff, N. Y ... 5
Burden Iron Works, Troy, N. Y ... 4
Collins H. E. & Co., Pittsburgh, Pa ... 4
Houdlette & Ellis, Boston, Mass ... 4
Kirkpatrick, Beale & Co., Pittsburgh, Pa ... 4
Leonard John, 450 and 451 West, N. Y ... 4
Oxford Iron Co., 81 Washington, N. Y ... 4
Phœnix Iron Co., 410 Walnut, Philadelphia ... 5
Roane Iron Co., Chattanooga, Tenn ... 6
Rowland James & Co., 920 N. Delaware, Phila ... 5
Rowland Wm. & Harvey, Philadelphia ... 40
Shoenberger & Co., Pittsburgh, Pa ... 4
Taylor & Boggis, Cleveland, O ... 6
The Passaic Rolling Mill Co., Paterson, N. J ... 4
Vulcan Iron and Nail Works, Chattanooga, Tenn .. 6
U. S. Iron and Tin Plate Co., Pittsburgh, Pa ... 4
Wason Car and Foundry Co., Chattanooga, Tenn .. 6
Zug & Co., Pittsburgh, Pa ... 4

Iron, Planished Sheet, *Manufacturers of.*
Wood W. D. Co., Pittsburgh, Pa ... 4

Iron, Swedish, *Importers of.*
Mitander Nils, 69 William, N. Y ... 4

Ironware.
Lalance & Grosjean Mfg. Co., 89 Beekman, N. Y ... 7

Ironware (Granite.)
St. Louis Stamping Co., St. Louis, Mo ... 25

Kitchen Sinks.
Magee Furnace Co., Boston, Mass ... 6

Lanterns, *Manufacturers of.*
Dietz R. E. (Tubular) 54 and 56 Fulton, N. Y ... 40
Howard & Morse, 45 Fulton, N. Y ... 2

Lathe Dogs.
North Selden G., Philadelphia ... 36

Lathes.
Johnson, Jr. Israel H. & Co., Philadelphia ... 39
Shepard H. L. & Co., Cincinnati, O ... 38

Lawn Mowers.
Mast, Foos & Co., Springfield, O ... 12

Lead Pipe, &c., *Manufacturers of.*
Bayley, Farrell & Co., Pittsburgh, Pa ... 2

Levels.
Disston Henry & Sons, Philadelphia ... 29

Locks, *Manufacturers of.*
Bohannan Wilson, Broadway and Kossuth, Brooklyn, E. D ... 34
D. K. Miller Lock Co., Philadelphia, Pa ... 28
Hoyt Fred J., 733 Broadway, N. Y ... 28
Romer & Co., Newark, N. J ... 34
Smith & Egge Mfg. Co., Bridgeport, Conn ... 8
Stewart & Mattson, Philadelphia, Pa ... 28
Union Nut Co., 99 Chambers, N. Y ... 34
Yale Lock Mfg. Co., 53 Chambers, N. Y ... 7

Machinery, *Makers of.*
Bliss & Williams, 167 Plymouth, Brooklyn ... 39
Pittsburgh Mfg. Co., Pittsburgh, Pa ... 12
Pratt & Whitney Co., Hartford, Conn ... 39
Sellers Wm. & Co., 1600 Hamilton, Philadelphia ... 39
The Bullard Machine Co., 14 Dey, N. Y ... 20
Wetherell Robert & Co., Chester, Pa ... 39

Machine Screws, *Makers of.*
Lyon & Fellows Mfg. Co., Williamsburg, N. Y ... 12

Machinists' Tools, *Makers of.*
Blaisdell P. & Co., Worcester, Mass ... 32
Davis A. J. & Co., Newark, N. J ... 39
Flanders L. B., Philadelphia ... 39
Frasse & Co., 62 Chatham, N. Y ... 38

Malleable Iron Castings, *Makers of.*
Hammer & Co., Branford, Conn ... 38

Mallets.
N. Y. Handle and Mallet Works, 456 E. Houston ... 34

Manganese.
Pyrolusite Manganese Co., 214 Pearl, N. Y ... 33

Measuring Tapes.
Eddy Geo. M. & Co., 353 Classon Ave., Brooklyn, N.Y. 9

Meat Chopping Machinery.
Murray Iron Works, Burlington, Iowa ... 8

Metal Dealers and Brokers.
Crane U. O., 104 John, N. Y ... 4
Dickerson, Van Dusen & Co., 29 and 31 Cliff, N. Y ... 2
Gregg H. L. & Co., 108 Walnut, Philadelphia ... 5
Phelps, Dodge & Co., Cliff, bet. John & Fulton, N. Y. 2
Purves A. & Son, cor. South and Penn, Phila ... 5
Quincy J. W., 98 William, N. Y ... 28
Sellew R. & Co., St. Louis, Mo ... 2

Metal Elbows.
Hogen Elbow Co., Cleveland, O ... 36

Metallurgists.
Britton J. Blodgett, 339 Walnut, Philadelphia ... 5

Metals Perforated.
Hayes G., 71 8th ave ... 2

Metal Roofing.
Brass Goods Mfg. Co., 280 Pearl, N. Y ... 2

Miners' Candles, *Makers of.*
James Boyd's Sons, 10 and 12 Franklin, N. Y ... 38

Mineral Lands, *Dealer in.*
Hoskins W. A., Chattanooga, Tenn ... 6

Mineral Wool.
Elbers Alexander D., 26½ Broadway, N. Y ... 5

Models.
Burrows Wm., 99 Fulton, N. Y ... 40
Eberhard Geo. F. & Co., Canton, O ... 25

Mouse Traps.
Dietz R. E., 54 and 56 Fulton, N. Y ... 40
Oliver E., 106 and 108 Beekman N. Y ... 3
Ripley Mfg. Co., Unionville, Conn ... 3

Mowing Machine Knife Grinder.
Fisher Henry, Canton, O ... 37

Nails.
Schoenberger & Co., Pittsburgh, Pa ... 4
Zug & Co., Pittsburgh, Pa ... 4

Nail Machinery.
Coyne & Hatry, Pittsburgh, Pa ... 4

Nickel Platers.
Hartman John, 37½ N. Seventh, Philadelphia ... 28
Jackson Geo. W., 21 E. 11th, N. Y ... 28
Wolff F. A., 59 Ann, N. Y ... 28

Nickel Platers' Supplies.
Colt A. T., 47 Beekman, N. Y ... 28
Condit, Hanson & Van Winkle, Newark, N. J ... 28
Zucker & Levett, 639 and 641 W. 51st, N. Y ... 27

Night Latches.
Many Francis, 143 Chambers, N. Y ... 8

Norway Shapes, *Rollers of.*
Rowland Wm. & Harvey, Frankford, Philadelphia. 40

Note Broker.
Gallaudet P. W., 3 and 5 Wall, N. Y ... 6

Nut Tapping Machines.
Howard Iron Works, Buffalo, N. Y ... 38

Nuts, Bolts, etc., *Makers of.*
Fuller Bros. & Co., 130 Greenwich, N. Y ... 4
Haskell W. H. & Co., Pawtucket, R. I ... 34
Lewis, Oliver & Phillips, Pittsburgh, Pa ... 12
Roseberry, Geo. D., Pottsville, Pa ... 4
Russell, Birdsall & Ward, Port Chester, N. Y ... 40
Shelton Co., Birmingham, Conn ... 40
Standard Nut Co., Pittsburgh, Pa ... 6
Sternbergh J. H., Reading, Pa ... 40
Union Nut Co., 99 Chambers, N. Y ... 34

Oil, Lubricating, *Makers of.*
Lester Oil Co., 81 Maiden Lane, N. Y ... 38

Oil Stones.
Boyd & Chase, 107th and Harlem River, N. Y ... 33

Oil Stoves.
Florence Machine Co., Florence, Mass ... 6
Pool Geo. & Sons, 70 and 72 Fulton, Brooklyn, N. Y .. 37

Old Iron, etc.
Gregg H. L. & Co., 108 Walnut, Philadelphia ... 5

Packing (Steam.)
"Empire Packing," Canfield Mfg. Co., Philadelphia. 38
Symonds & Co., Philadelphia ... 38

Paints and Oils, *Dealers in.*
Devoe F. W. & Co., 117 Fulton, N. Y ...

Pans (Dripping and Bread.)
Lewis, Dalzell & Co., Pittsburgh, Pa ... 8

Patent Solicitors.
Howson & Son, Phila. and Washington, D. C ... 7
Lenz & Schmidt, Berlin, N. W ... 7
Spencer A. H., 28 State, Boston, Mass ... 7
Stetson Thomas D., 23 Murray, N. Y ... 7

Pens (Steel.)
Perry & Co., Limited, 112 and 114 William, N. Y ... 28

Picks, *Makers of.*
Pierson & Co., 24 Broadway, N. Y ... 2

Pipes, Fittings, etc., *Makers of.*
Eaton, Cole & Burnham Co., 58 John, N. Y ... 26
McNab & Harlin Mfg. Co., 56 John, N. Y ... 26
Pancoast & Maule, 227 Pear, Philadelphia ... 26

Pipe Tongs.
Browning Joseph, Philadelphia ... 35

Pipe, Water and Gas, *Makers of.*
McNeal & Archer, Burlington, N. J ... 6
Wood R. D. & Co., 400 Chestnut, Philadelphia ... 26

Plane Irons, *Manufacturers of.*
Buck Bros., Millbury, Mass ... 11
D. R. Barton Tool Co., Rochester, N. Y ... 26

Planes, *Manufacturers of.*
Bailey, Leonard & Co., Hartford, Conn ... 40
Bailey Wringing Machine Co., 99 Chambers, N. Y .. 25
D. R. Barton Tool Co., Rochester, N. Y ... 26
Stanley Rule and Level Co., 35 Chambers, N. Y ... 11

Plated Ware.
Hall, Elton & Co., 75 Chambers, N. Y ... 11

Pliers.
Hagstoz & Thorpe, Ledger Building, Philadelphia .. 11

Plumbers' Materials, *Manufacturers of.*
Everhart Jas. M., Scranton, Pa ... 40
Carr Wm. S. & Co., 106 Center, N. Y ... 26

Pocket Knives.
Boker Hermann & Co., 101 Duane, N. Y ... 11

Portable Cooker.
Thorne G. L. & Co., 76 Warren, N. Y ... 40

Presses, Power, *Makers of.*
Bliss & Williams, 167 Plymouth, Brooklyn ... 39
Merriman A. H., West Meriden, Conn ... 39
The Stiles & Parker Press Co., Middletown, Conn .. 39

Pressure Blowers, *Makers of.*
Keystone Portable Forge Co., Philadelphia ... 38

Printers.
E. S. Dodge Printing Co., 95 Chambers, N. Y ... 13

Pulleys, Friction.
Mason, Volney W. & Co., Providence, R. I ... 40
Penfield Block Works, Lockport, N. Y ... 26
Providence Tool Co., Providence, R. I ... 26

Pump Pistons.
Sprague Wm. & Co., Philadelphia ... 39

Pumps, *Makers of.*
Douglas W. & B., Middletown, Conn ... 7
Rumsey & Co., Seneca Falls, N. Y ... 7
Rumsey S. M. & Co., St. Louis, Mo ... 36
Southern Pump and Pipe Co., Chattanooga, Tenn .. 6
Union Mfg. Co., 98 Chambers, N. Y ... 7

Railroad Supplies.
Jackson & Tyler, Baltimore, Md ... 36

Rails, Iron or Steel, *Makers of.*
Atkins Bros., Pottsville, Pa ... 6
Cambria Iron Co., Johnstown, Pa ... 5
Cleveland Rolling Mill Co., Cleveland, Ohio ... 6
The Edgar Thomson Steel Co., 57 Broadway, N. Y .. 33

Railway, Car and Locomotive Forgings.
Wilson, Walker & Co., Pittsburgh, Pa ... 4

Revolving Scrapers.
Revolving Scraper Co., Columbus, Ohio ... 6

Rivets.
Grundy, Geo. C., 165 Greenwich, N. Y ... 34
Hoopes & Townsend, Philadelphia ... 12
Old Colony Rivet Works, Kingston, Mass ... 13
Townsend W. P. & Co., Pittsburgh, Pa ... 12

Road Scrapers, etc.
Semple & Birge Mfg. Co., St. Louis, Mo ... 6

Rolling Mill Machinery, etc., *Manufacturers of.*
Moore, James, cor. 16th and Buttonwood, Phila ... 39

Rules, *Manufacturers of.*
Stanley Rule and Level Co., 35 Chambers, N. Y ... 11
Stephens & Co., Riverton, Conn ... 37

Sad Irons.
American Machine Co., Philadelphia ... 34
Enterprise Mfg. Co., Philadelphia ... 13

Sand and Emery Paper, *Makers of.*
Baeder, Adamson & Co., 730 Market, Philadelphia ..

Sash Locks.
Payson & Co., Chicago, Ill ... 13

Saws, *Makers of.*
American Saw Co., Trenton, N. J ... 37
Boynton, E. M., 80 Beekman, N. Y ... 40
Disston Henry & Sons, Phila ... 29
Peace & Hogan, Williamsburg, N. Y ... 37
Wheeler, Madden & Clemsen Mfg. Co., Middletown, N. Y ... 37

Saw Frames, Wood, *Makers of.*
Peace Harvey W., Williamsburg, N. Y ... 37

Scales, *Manufacturers of.*
Brandon Mfg. Co., Brandon, Vt ... 7
Chattillon John & Sons, 91 Cliff, N. Y ... 9
Riehle Bros., 9th above Master, Phila ... 28
Southwark Hardware Co., Philadelphia ... 32

Scoops.
Semple & Birge Mfg. Co., St. Louis, Mo ... 13

Screws, *Makers of.*
American Screw Co., Providence, R. I ... 16 & 17
Miles F. S., 205 Quarry, Phila ... 12
Philadelphia Screw Co., Philadelphia, Pa ... 8
Russell & Erwin Mfg. Co., New York ... 10

Screws, *Importers of.*
Bruce Geo. W., 1 Platt, N. Y ... 6

Screw Cutting Machinery.
Howard Iron Works, Buffalo, N. Y ... 38
Wiley & Russell Mfg. Co., Greenfield, Mass ... 38

Screw Drivers, *(Improved) Makers of.*
Disston Henry & Sons, Phila ... 29

Scythe Stones.
Dishman F. E., New Albany, Ind ... 33
Pike A. F., East Haverhill, N. H ... 28

Sewer Gas Traps.
Buhrer S., Cleveland, O ... 6

Shafting.
Wood Thomas, Philadelphia ... 38

Shovels, &c.
Hubbard, Bakewell & Co., Pittsburgh, Pa ... 28
Kimball Shovel Co., Baltimore, Md ... 34
Rowland B. & Co., Philadelphia ... 19

Shot, &c.
Sparks Thos. W., 121 Walnut, Philadelphia ... 37

Shears (Sheep).
Hildick A. H. & Co., 12 Warren, N. Y ... 11

Side Spring Connecting Rods.
Topliff & Ely, Elyria, O ... 12

Smelting Works.
Reeves Paul S., 760 South Broad, Phila ... 40

Spelter.
Manning & Squier, 113 Liberty, N. Y ... 2

Spiral Pipe (Wrought Iron).
Abendroth & Root Mfg. Co., 28 Cliff, N. Y ... 35

Springs.
Carey & Moen, 234 W. 29th, N. Y ... 3
Rowland Wm. & Harvey, Frankford, Phila ... 40

Stamped and Japanned Tin Ware.
Shepard Sidney & Co., Buffalo, N. Y ... 31
The Chicago Stamping Co., Chicago, Ill ... 3

Steam Boilers.
Firmenich J. G. & F., Buffalo, N. Y ... 28

Steam Hammers, &c., *Makers of.*
Dudgeon Richard, 24 Columbia, N. Y ... 36

Steam Pumps, &c., *Manufacturers of.*
Cameron A. S., East 23d, N. Y ... 38
Clayton Jas., 11 Water, Brooklyn, N. Y ... 3
Crane Bros. Mfg. Co., Chicago, Ill ... 36
Knowles Steam Pump Works, 92 Liberty, N. Y ... 39
McGowan John H. & Co., Cincinnati, O ... 39
Valley Machine Co., Easthampton, Mass ... 36

Steam Traps.
Albany Steam Trap Co., Albany, N. Y ... 39

Steel Castings, *Manufacturers of.*
Chester Castings Co., Evelina, Phila., Pa ... 40
Cleveland Cast Steel Works, Cleveland, O ... 33
Eureka Cast Steel Co., Chester, Pa ... 40
Flagg Stanley G. & Co., 216 and 218 N. 3d, Phila ... 40
Pittsburgh Steel Casting Co., Pittsburgh, Pa ... 40

Steel Importers.
Carr J. & Riley, 82 John, N. Y ... 32
Hobson Francis & Son, 97 John, N. Y ... 32
Jonas, Meyer & Colver, Hartford, Conn ... 32
Moss F. W., 80 John, N. Y ... 32
Piersons & Co., 24 Broadway, N. Y ... 4
Van Wart, Son & Co., 134 and 136 Duane, N. Y ... 11
Wolff R. H. & Co., 16 Cliff, N. Y ... 32

Steel (Mushet Special).
Randall & Jones, 10 Oliver, Boston, Mass ... 32

Steel Manufacturers.
Cleveland Rolling Mill Co., Cleveland, O ... 6
Gautier D. G. & Co., Jersey City, N. J ... 32
Midvale Steel Works, Nicetown, Phila., Pa ... 32
Miller, Metcalf & Parkin, Pittsburgh ... 32
Rowland Wm. & Harvey, Frankford, Phila ... 40
Sanderson Bros., Steel Co., Syracuse, N. Y ... 32
Smith, Sutton & Co., Pittsburgh, Pa ... 32
Singer, Nimick & Co., Pittsburgh, Pa ... 3
Standard Steel Works, Philadelphia, Pa ... 5
Steel Restorative Works, 119 Greenwich av., N. Y .. 32
The Edgar Thomson Steel Co., 57 Broadway, N. Y .. 33
Wardlow S. & C., Sheffield, England ... 32

Steel Shutters.
Clark & Co.'s, 162 and 164 W. 27th, N. Y ... 9

Steel Spiral Springs, *Manufacturers of.*
Cary & Moen, 234 W. 29th, N. Y ... 3
Chatillon & Sons, 91 and 93 Cliff, N. Y ... 9

Stocks and Dies.
Holroyd & Co., Waterford, N. Y ... 37

Stone Ironware.
Metal Stamping & Enameling Co., St. Louis, Mo ... 3

Stove Boards, *Manufacturers of.*
Ansonia Brass and Copper Co., 19 and 21 Cliff, N. Y. 2
Shepard Sidney & Co., Buffalo, N. Y ... 31

Stove Pipe.
Shepard Sidney & Co., Buffalo, N. Y ... 36

Stove Repairs.
Metzner W. C., Chicago, Ill ... 6

Stoves.
Michigan Stove Co., Detroit, Mich ...

Tacks.
American Tack Co., Fairhaven, Mass ... 28
Dunbar, Hobart & Whidden, 116 Chambers, N. Y ... 25
Field A. & Sons, Taunton, Mass ... 9
Grundy Geo. C., 165 Greenwich, N. Y ... 34
Shelton Co., Birmingham, Ct ...

Taps and Dies.
Carpenter J. M., Pawtucket, R. I ... 40
Manning H. S. & Co., 111 Liberty, N. Y ... 36

Tin Plate, *Manufacturers of.*
U. S. Iron and Tin Plate Co., Pittsburgh, Pa ... 4

Try Squares, Bevels, &c., *Makers of.*
Bailey Leonard & Co., Hartford, Ct ... 38
Disston Henry & Sons, Phila ... 29

Tube Expanders.
Dudgeon Richard, 24 Columbia, N. Y ... 36

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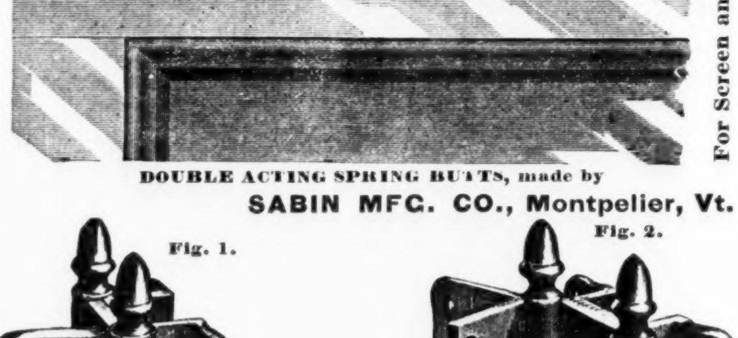

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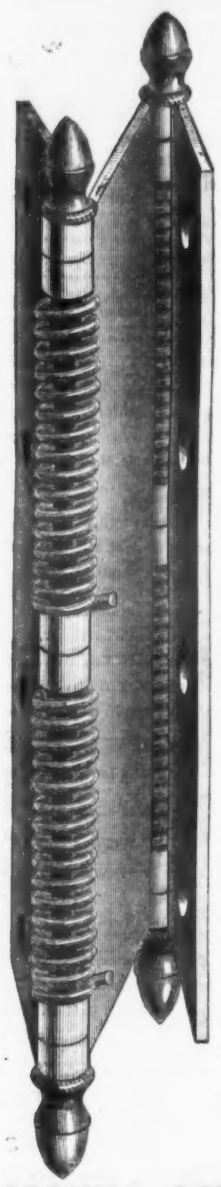

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The 4½x4½ is Extra Heavy.

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5 "	16 50	21 00	21 50	26 00

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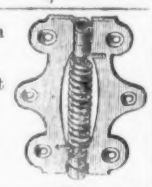

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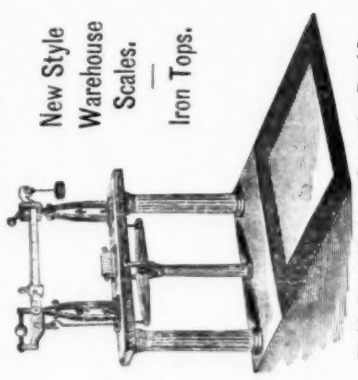

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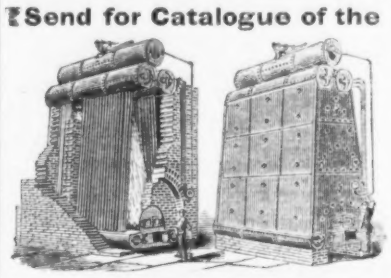

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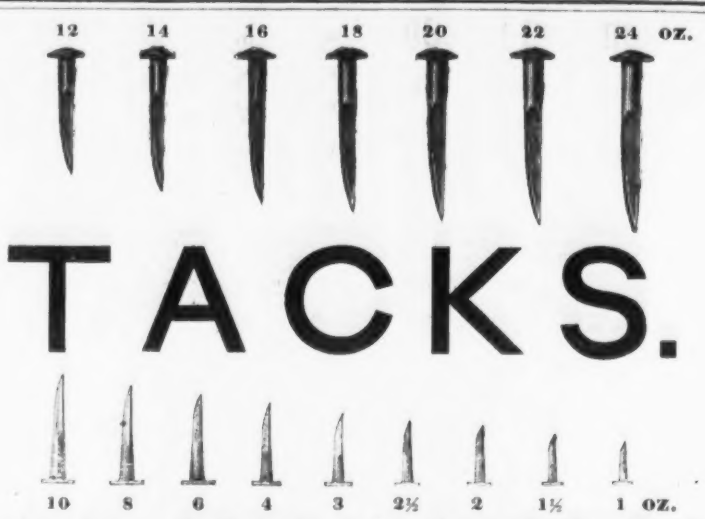

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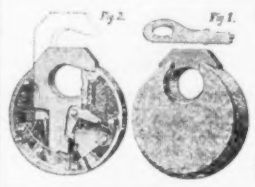

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Stones gotten up or labeled in any style desired. Price and quality guaranteed.

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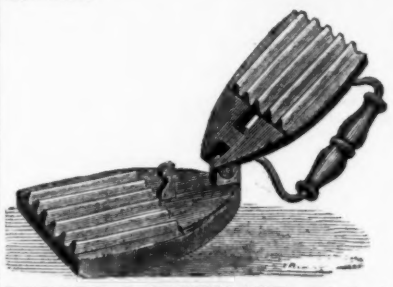

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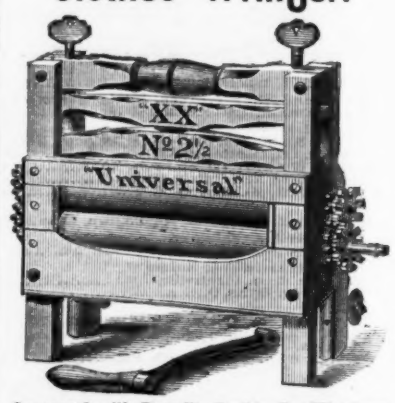

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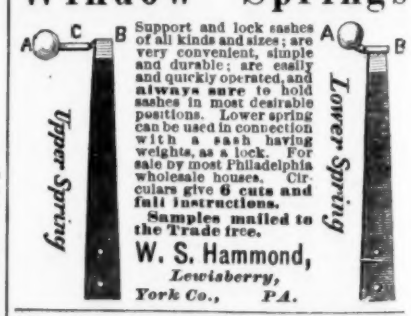

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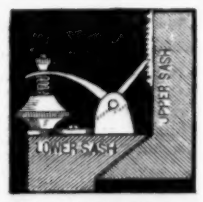

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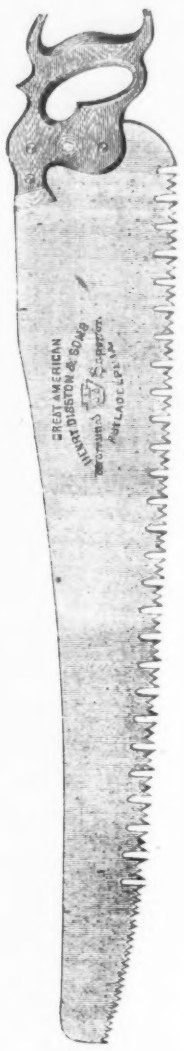

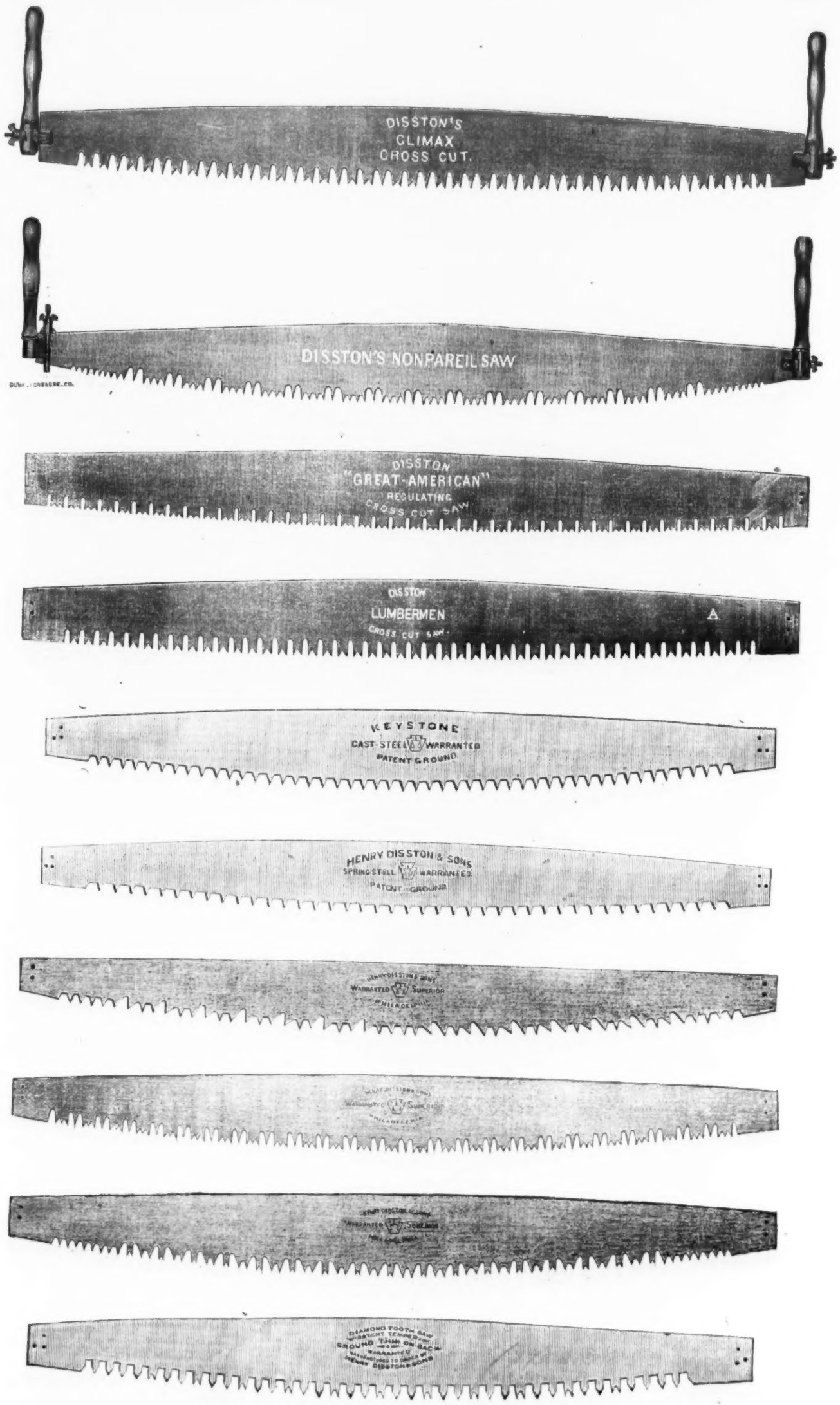

New York Wholesale Prices, May 29, 1878.

HARDWARE.

Anvils.
American ... ₱ lb 15c—dis 20 %
Wright's ... ₱ lb gold 10¼c over 250 lbs 10¼c, gold
Armitage's Mouse Hole ... gold 9¾ @ 10c
Wilkinson's ... ₱ lb gold 11c
Eagle Anvils (American) ... ₱ lb 9c dis 20 %

Apple Parers, &c.
Turn Table ... ₱ doz $6.75, dis 10 %
Lightning ... ₱ doz 6.75, dis 10 %
Bay State ... ₱ doz 13.00, dis 10 %
Reading, '72 ... ₱ doz $6.00, dis 10&2 %
" '74 ... ₱ doz 7.00, dis 10&2 %
" '75 ... ₱ doz 8.00, dis 10&2 %
" '78 ... ₱ doz 8.75, dis 10&2 %
Climax Corer and Slicer ... ₱ doz 6.75, dis 10 %

Augers and Bits.
Conn. Valley Mfg. Co / Douglass Mf. Co / Ives / Beecher (French, Swift & Co) / Griswold / Nobles Mfg. Co / Kasson's Patent } dis 50 @ %
Cook's, Douglass Mfg. Co ... dis 50&5 %
Cook's, Ives' ... dis 45&10 %
Snell Mfg. Co ... dis 30&10 %
Jennings' Bits ... dis 10&10 %
Imitation Jenning's Bits ... dis 30 %
Ives' "Jennings" Bits ... dis 25 %
Lewis' Single Twist Bits ... dis 40 %
Andrews Bits ... dis 50 %
Griswold's Patent Bits ... dis 30 %
Expansive Bits, Clark's, small, $18; large, $26 .. dis 20 %
" " Ives ... $20 @ $30—dis 33⅓ %
" " Blake's ... $20—dis 40 %
" " Parmelee's ... small, $20; large, $36 ... dis 25 %
Hollow Augers Ives' / French, Swift & Co } dis 40 %
" " Bonney's Adjust., ₱ doz $48—dis 25&10 %
" " Stearns' Adjust., ₱ doz $48—dis 25&10 %
" " Ives' Expansive ... each $4.50—dis 40 %
" " Univ'sal Expansive, each $4.50—dis 20 %
Gimlet Bits ... $7.50 ₱ gross, dis 40 %
" Diamond ... ₱ doz $1.00 dis 25 %
" "Bee" ... dis 25&10 %
Double Cut Gimlet Bits Shepardson's ... dis 40 %
" " Ct. Valley Mfg. Co ... dis 30&10 %
" " Hartwell's ... dis 50&10 %
" " Douglass' ... dis 40 %
" " Ives' ... dis 40&10 %
Morse's Bit Stock Drill, List of May 15, '78 ... dis 25 %
L'Hommedieu's Ship Augers ... dis 15 %
Watrous Ship Augers ... dis 15 %

Awl Hafts.
Sewing, Brass Ferrule ... $3.50 ₱ gross—dis 35&10 %
Peg, " ... 3.50 " dis 35&10 %
Patent Sewing, Short ... $1.00 ₱ doz—dis 35&10
" " Long ... $1.40 ₱ doz—dis 10 %
" Peg, Plain Top ... $10.00 ₱ gross—dis 35&10 %
" " Leather Top ... 12.00 " dis 35&10 %

Awls, Brad Sets, &c.
Awls Sewing, Common ... ₱ gross $1.35—dis 25 %
" Sewing, Best ... ₱ gross 1.40—dis 10 %
" Shouldered Peg ... ₱ gross 2.25—dis 15 %
" Patent Peg ... ₱ gross .60—dis 15 %
" Shouldered Brad ... ₱ gross $2.70—dis 25&10 %
" Handled Brad ... $8.00 ₱ gross—dis 35&10 %
" Handled Scratch ... $7.50 ₱ gross—dis 25&10 %
" Socket Scratch ... $1.00@$1.25 ₱ doz—net
Brad Sets, Aiken's ... ₱ doz $12.00—dis 40&10 %
" No. 42, $10.50; No. 43, $12.50 ... dis 60 %
" Stanley's Excelsior, No. 1, $11.00—dis 25&10 %

Axles.
Common (Guy C. Hotchkiss, Field & Co.) ... ₱ lb 4¼c
Solid Collar, Case Hardened, Chilled Box ... ₱ lb 8c
Axle Grease.—Frazer's ... ₱ lb 6c

Balances.
Light or "Common" ... dis 25&10 %
All other Spring Balances ... dis 25 %
Bed Keys.—Gray's Ratchet ... ₱ doz $4.00, dis 15 %

Bells.
Hand, Light Brass ... dis 75 %
" Extra Heavy ... dis 40&5&10 %
" White Metal ... dis 60&5&10 %
" Silver Chime ... dis 20&10 %
" Swiss ... dis 25 %
" Globe (Cone's Patent) ... dis 25&10 %
Gong, Abbe's ... dis 20&10 %
" Yankee ... dis 35&10 %
" Barton's ... dis 40&2 %
Crank, Taylor's ... dis 25&10 %
" Brook's ... dis 50 %
" Cone's ... dis 10 %
" Connel's ... dis 50&10 %
Lever, Sargent's ... dis 65&10 %
" Taylor's Bronze or Plated Lever ... net
" " Japanned Lever ... dis 25&10 %
" Hart, Bliven & Mead Mfg. Co ... dis 50&10&2 %
Pull, " " ... dis 50&10&2 %
" Brook's ... dis 50 %
" Western ... dis 25&10 %
Call ... dis 20 %
Cow, Common Wrought ... dis 20&10 %
" Western ... dis 20&10 %
" " Sargent's ... dis 60&10 %
" Kentucky "Star" ... dis 20&10 %
" " Sargent's ... dis 60&10 %
" Dodge's Genuine Kentucky, new list—

Nos.	0	1	1½	2	3	4	5	6	Hog	
	$12.00	10.00	9.00	8.00	6.00	5.00	3.50	2.50	5.00	dis 50 %

" Yaw's Genuine ... dis 50 %
" Texas ... dis 40&10 %

Bellows.
Blacksmiths', Common ... dis 40 %
" Extra and Pittsburgh Pattern ... dis 20 %
Moulders' ... dis 25 %
Hand Bellows ... dis 20 %
Blind Adjusters.—Domestic ... ₱ doz $3.00, dis 20 %
Blind Fasteners.—Mackrell's ... dis 30 %
Van Sand's ... No. 2000, $14.00, dis 25&10 %
" old pattern ... ₱ gross, $10.50, dis 50&10 %
Washburn's Patent ... ₱ gross $14.00, dis 30 %
Merriman's ... new list net

Blind Staples.
Boardman's Patent, ½ in. and larger ... ₱ lb 25c
" ⅜ in ... ₱ lb 30c
Harvey's Patent ... ½ & ⅝ in. ₱ lb 28c., dis 10 %
" ⅜ in ... ₱ lb 34c., dis 10 %
Blocks.—Burr & Co ... dis 25 %
Differential Pulley Blocks ... dis 20 %
Tackle, Rope and Iron Strapped (The Penfield B. W.) ... dis 40 %
Stanley Rule and Level Co ... dis 33⅓&10 %

Blowers.
Keystone Portable Forge Co ... dis 20 %

Bolts.
Cast Iron Barrel, Shutter, &c ... dis 65&10 %
Cast Iron Chain (Sargent's list) ... dis 65&10 %
Bush's Lever Bolts ... dis 40, 10&10 %
Spring Butts (Humason & Beckley Mfg. Co.) dis 40&10 %
Wrought Iron Barrel ... dis 50, 10&10 %
" " Square ... dis 50, 10&10 %
" " Shutter (Stanley's list) ... dis 50 %
" " " (Sargent's new list). dis 50, 10&10 %
" " Sunk Flush, Sargent's ... dis 50&10&10 %
" " " " Stanley's ... dis 15&10 %
" " B.K.Flush, Comm'n, Stanley's. dis 30&10 %
" " " " Ex. Heavy, " dis 20&10 %
" " Plated Knob & Slide Flush " dis 10&10 %
Carriage and Tire, Common ... dis 75&3 % cash
" " Norway Iron ... dis 70 %
" " R. B. & W ... (old list) dis 70&5 % cash
" " Philadelphia ... dis 70 %
" " Coleman ... dis 60&10 @ 60&20 %
" " Shelton's ... (old list) dis 70&5 %
Tire, Am. Screw Co ... dis 70&7½ %
" "Bay State" ... dis 75&15 %
Star (Phila) ... dis 60&10@60&20 %
Union Nut Company ... dis 70 %
Stove—American Screw Co.'s ... dis 60 %
" R. B. & W ... dis 50&10&5 %
" Union Nut Co ... dis 50 %
Plow ... dis 50 %
Machine ... dis 65&10 %
Bolt Ends ... dis 60
Bolt and Rivet Clippers—Chambers ... dis 25 %
Borax ... 12c ₱ lb net

Boring Machines. Upright. Angular.
First quality, no Augers ... $5.50 $7.50 dis 40&10 %
" with Augers ... 9.00 11.00 dis 40&10 %
Second quality, no Augers .. 2.35 3.00 net
" with Augers 4.00 4.65 net
Snell's, no Augers ... 4.75 6.25 dis 25 %
Phillips' with Augers ... ... 10.00 dis 25 %

Bow Pins.
Union Nut Co ... dis 60&10 %
Hotchkiss' ... low list dis 10 %
Humason, Beckley & Co.'s ... dis 60 %
Sargent & Co.'s ... $10.70 and $21.40, dis 60&10 %
Braces.—Barber's Patent ... dis 40&5 %
O. S. Backus ... dis 50&10 %
Wilson Mfg. Co ... dis 10 %
Spofford's Patent ... dis 50&5 %
Noble's Patent ... dis 40&5 %
Ives' "Centennial" ... dis 50 %
Common Bal (American) ... dis 25&10 %
Brackets.—Shelf (Sargent's) .. dis 60&10 @ 60&10&10 %
Swing (T. & S. Mfg. Co.) ... dis 33⅓ %
Bright Wire Goods ... dis 75&10 %
Bull Rings.—Union Nut Co ... dis 50&20 %
Sargent's ... dis 66⅔&10 %
Hotchkiss' ... low list dis 10 %
Humason, Beckley & Co.'s ... dis 60 %
Union Nut Co ... dis 60&10 %

Butts.
Wrought Brass ... dis 75 %
Cast Brass, Tiebout's ... dis 40 %
" Corbin's ... dis 50&10 %
COMMON CAST, NOT DRILLED.
Fast Joint, Narrow ... dis 60&10 %
" Broad ... dis 65&10 %
Loose Joint, Narrow and Broad ... dis 70&10 %
Parliament Butts ... dis 65&10 %
Mayer's Hinges ... dis 70&10 %
DRILLED AND WIRED.
Fast Joint, Narrow ... dis 50&10 %
" Broad ... dis 55&10 %
" Broad, Japanned ... dis 35&10 %
Loose Joint ... dis 66⅔&10 %
" Japanned ... dis 62½&10 %
" with Acorns ... dis 65&10 %
Parliament Butts ... dis 60&10 %
Mayer's Hinges ... dis 65&10 %
Loose Pin, no Acorn ... dis 66⅔&10 %
" Acorns ... dis 66⅔&10 %
" " Japanned ... dis 70&10 %
" " " Plated Tips ... dis 65&10 %
Union Mfg. Co.'s Fancy Butts—
Figured Enameled Loose Joint ... dis 60&10 %
Boston Finish, Plain ... dis 80&10 %
" " with Iron Acorns ... dis 75&10 %
" " with Silvered Acorns ... dis 60&10 %
WROUGHT IRON.
Fast Joint Narrow ... dis 40&10 %
Lt. Narrow ... dis 35&10 %
Broad ... dis 40&10 %
Loose Joint, Broad ... dis 40&10 %
Table Butts, Back Flaps &c ... dis 35&10 %
Inside Blind, Regular ... dis 35&10 %
Light ... dis 40&10 %
Loose Pin, Wrt ... dis 50&10 %
Spring Hinges:
American Spiral Spring Butt Co., Jap'd ... dis 25 %
" " " " Fancy ... dis 10 %
Sabin Mfg. Co.'s Double Acting ... dis 35 %
Centennial, Japanned ... dis 25 %
" Ornamental ... dis 20 %
Union Spring Hinge Co.'s ... dis 25 %
American Spring Hinge Co.'s ... dis 25 %
Union Mfg. Co ... dis 25 %
Scovill Brass ... dis 33⅓&10 %
Blind Butts, Parker ... dis 70 %
" Palmer ... dis 40&5&10 %
" Seymour ... dis 65&10&10 %
" Shepard ... dis 70 %
" Lull & Porter ... dis 66⅔&10 %
" Nicholson ... dis 45&10 %
" Huffer ... dis 40&10 %
" Clark's, Nos. 1, 3, 5, 40 and 50 ... dis 70 %
" Sargent's ... dis 70&5&10 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co ... dis 20 %
D. R. Barton Tool Co ... dis 20 %
Bradley's ... dis 25 %
Beatty's ... dis 25 %

1	2	3	4	5	6	7	8
$16.50	19.00	21.50	24.00	27.00	30.00	33.50	36.50

Hart Mfg. Co ... dis 50&10 %

0	1	2	3	4	5	6
$20.00	26.00	30.50	33.00	37.00	41.00	45.00

Can Openers.
Messenger's Comet ... ₱ doz $3.00, dis 20 %
American ... ₱ doz $2.25, dis 60 %
Lyman's ... ₱ doz $3.75, dis 20 %
Poole ... ₱ doz $3.75, dis 40 %
No. 4, French ... ₱ doz $2.25, dis 50 %
No. 5, Iron Handle ... ₱ doz $2.25, dis 60 %
Eureka ... ₱ doz $2.50, dis 10 %
Sardine Scissors ... ₱ doz $7.00, dis 45 %
Star ... ₱ doz $5.00, dis 25 %

Caps—Percussion, ₱ 1000.
Hicks & Goldmark's G. D. & S. R ... 35c
" " E. B. 1-10 Ground ... 70c, dis 6 %
" " E. B. 1-10 Turned ... 65c, dis 5 %
" " D. W. P. 1-10 ... $1.40, dis 5 %
" " D. W. P. ¾ ... 1.35, dis 5 %
" " Colt's 1-10 ... 70c, dis 5 %
Ely's E. B ... 1-108, 65 @ 68c. gold
" Double Waterproof, 1-48, $1.50; 1-108, $1.58c, gold
Colt's ... 1-108, 80c gold
Cartridges.—Metallic ... dis 60&7 %
Cards.—Horse and Curry ... dis 33⅓&10 %
Cotton ... dis 70&10 %
Wool ... dis 20&10 %

Carpet Stretchers.
Cast Steel, Polished ... ₱ doz $5.00, dis 30 %
" Iron, Steel Points ... ₱ doz $2.00, dis 45&5 %

Casters.
Bed ... dis 55 %
Plate and Shallow Socket ... dis 55 %
Deep Socket ... dis 40 %

Cattle Leaders.
Hotchkiss' Sons' ... dis 10&10 %
Humason, Beckley & Co.'s ... dis 60 %
Sargent's ... dis 60&10&10 %
Union Nut Co ... dis 60&10 %

Chain.
Trace, 6½-1-2 ... by the cask, ₱ pair 45 @ 46c
" 6½-10-3 ... by the cask, ₱ pair 43 @ 44c
" 7-10-2 ... by the cask, ₱ pair 49 @ 50c
German Halter Chain ... dis 30&5 % gold
" Coil ... dis 30&5 % gold
Galvanized Pump Chain ... ₱ lb 10½c dis 10 %
Jack Chain, Iron ... dis 60&5 %
" Brass ... dis 50&5 %

Chalk.
White ... ₱ gross 55c net
Red ... ₱ gross 75c net
Blue ... ₱ gross 90c net
White Crayons ... ₱ gross 13½c net

Cherry Stoners.
"Family" ... ₱ doz $6.75 dis 11 %

Chisels.
D. R. Barton Tool Co. (all kinds) ... dis 20 %
Socket Framing, Crossman ... dis 65&10 %
" " Buck Bros ... new list, dis 25 %
" " Hart Mfg. Co ... dis 65&5&10&2 %
" " Merrill ... dis 60&10 %
" " Witherby Tool Co ... dis 60&10 %
" " Douglass' ... dis 70 %
" Firmers, Crossman ... dis 65&5 %
" " Buck Bros ... new list, dis 25 %
" " Hart Mfg. Co., extra .. dis 65&5&10&2 %
" " Merrill ... dis 60&10 %
" " Witherby Tool Co ... dis 60&10 %
" " Douglass' ... dis 70&5 %
" Corner ... dis 65@70 %
Tanged Firmers extra ... dis 40 %
" " Butcher's ... $5.00 @ $5.25 to £ gold
" " Newbould's ... 5.50 to £ gold
" " Spear & Jackson's ... 5.00 to £ gold
" " Buck Bros (Shank) ... 5.00 to £ gold

Clamps.
Iron, Providence Tool Co.'s, Wrt. Iron ... dis 25 %
" Adjustable, Gray's ... dis 20 %
" " Lambert's ... dis 20 %
" " Snow's ... dis 40&5 %
" " Hammer's ... dis 15 %
" " Stearns' ... dis 15&10 %
" Cabinet, Sargent's ... dis 60&10&10 %
" Carriage Makers', Sargent's ... dis 60&10&10 %
" Cord and Tape (T. & S. Mfg. Co.) ... dis 30 %

Clips, Axle.
Norway or Best ... dis 60 %
Superior ... dis 60&10 %
Cockeyes ... 1¼ in., 28c.; 1½ inch, 33c.; 1¾ in., 37c, net

Cocks, Brass.
Racking, L. F. & C. list ... dis 50 %
" Peck Bros. list ... dis 55 %
Globe ... dis 50 %
Plain Bibbs ... dis 50 %
Ale and Beer, L. F. & C. list ... dis 20&10 %
" " Peck Bros. list ... dis 50 %

Coffee Mills.
Board and Box ... dis 20@25 %
Increase Wilson's ... net
Selsor's Pat ... $9.50, $10.50, dis 25 %
American (Enterprise Mfg. Co.) ... dis 20 %
French Steel ... dis 20 %
The Swift (Lane Bros.) ... dis 25 %

Compasses, Dividers, &c.
Compasses ... dis 35&10 %
Callipers ... dis 30&10 %
Dividers ... dis 55 %
Bemis & Call Co.'s Dividers ... dis 35&10&33⅓ %
Bemis & Call Co.'s Compasses & Callipers. dis 35&10&10 %
Cook's ... dis 15 %
Excelsior ... dis 50 %
Miller's Patent ... dis 25 %

Coopers' Tools.
Bradley's ... dis 15 @ 20 %
D. R. Barton Tool Co ... dis 20 %
Corkscrews.—Humason & B ... dis 33⅓ %
Corn Knives and Cutters.—Bradley's ... dis 10 %

Crow Bars.
Cast Steel ... ₱ lb 9c net
Iron, Steel Points ... ₱ lb 5c
Crucibles.—Gautier & Co ... ₱ No. 5½c

Curling Irons, &c.
⅜, ⅝, ¾ in., $1.80, 2.00, 2.40 ... dis 10 %
Curling Tongs ... ₱ doz $4.25, dis 10 %
Pinching Irons ... ₱ doz 7.50, dis 20 %

Curry Combs.
Curry Comb Mfg. Co ... dis 25&10
Fitch's (List of No. 240, $1) ... dis 33⅓&10 %
Hotchkiss' & Kellogg's, Iron & Brass, old list. dis 40&7½ %
Hotchkiss' Novelty ... dis 20&10 %
Rubber ... ₱ doz $9.00. dis 20&10 %
Curtain Pins.—Silvered Glass ... dis 15 %
White Enamel ... dis 15 %

Cutlery.
Meriden Cutlery Co. (Table) ... net
Am. Miller Bro.'s Cutlery Co ... dis 25 %
Humason & Beckley, Pocket ... dis 25 %
Naugatuck Cutlery Co ... list net
New York Knife Co. (Pocket) ... dis 35&5 % cash
" " (Table) ... net

Dippers.
Britannia ... ₱ doz $3.75 @ $4.25, net
Cocoa, Plain ... ₱ doz $3.25, dis 20 %
" Rimmed ... ₱ doz 3.75, dis 20 %

Dog Collars.
Embossed Gilt ... dis 20 %
Leather ... dis 30 %
Brass ... dis 25 %

Door Springs.
Torrey's Rod ... ₱ doz $2.00 net
Gray's " ... ₱ doz $1.65, net
Johnson's Rod ... ₱ doz 3.00, net
Gem (Coil)—
No. 1, Large, Japanned ... ₱ doz $3.50 }
No. 2, Medium, " ... ₱ doz 2.50 } dis 10 %
No. 3, Small, " ... ₱ doz 2.00 }

Challenge (Coil)—	Nos. 9	7	6	
Japanned ... ₱ doz	$2.00	2.50	3.50	dis 15 %
Coppered ... ₱ doz	4.00	4.50	5.00	
Galvanized ... ₱ doz	3.50	4.00	4.50	
Nickeled ... ₱ doz	5.50	6.00	7.00	

Premium (Coil)—	Nos. 1	2	3	
Japanned ... ₱ doz	$7.50	6.25	5.00	dis 30 %
Nickeled ... ₱ doz	11.00	9.50	8.00	

Star (Coil)—For Cop'd, Nickel-Plated, &c., see list.
No. 4, ("Shoo Fly") Screen door size ₱ doz $1.80 }
No. 5, Screen Door Size ... ₱ doz $2.00 } dis 25 %
No. 6, Medium ... ₱ doz 2.50 }
No. 7, Large ... ₱ doz 3.50 }
Sabin's Lever .. No. 1, $1; 2, $1.50; 3, $2; 4, $2.50; dis 30 %
Sabin's Boss ... ₱ doz $4.20, dis 40&10 %
Philadelphia ... 5 in., $5.00; 8 in., $7.00, dis 35 %
Barker's Concealed ... dis 20 %
Cowell's ... No. 1, $18.00; No. 2, $15.00 ₱ doz, dis 50 %
Rubber, complete ... ₱ doz $1.90, net

Drawing Knives.
Crossman's No. 1 ... dis 65&1 %
D. R. Barton Tool Co ... dis 20 %
Hart Mfg. Co., extra ... dis 65&5&10&2 %
Merrill ... dis 60&10 %
Nobles Mfg. Co ... dis 15 %
Bradley's ... dis 35 %
Adjustable Handle ... dis 20 %
Witherby Tool Co ... dis 60&10 %
Douglass' ... dis 70 %

Drills and Drill Stocks.
Blacksmiths' ... each $2.15 net
" Self-Feeding ... each $7.50, dis 10 %
Breast, P. S & W ... dis 25 %
Breast, Hotchkiss ... dis 10
" Wilson's ... dis 20 %
" Miller's Falls ... each $2.50, dis 25 %
Ratchet, Merrill's ... dis 20 %
" Ingersoll's (old list) ... dis 35 %
" Whitney's ... dis 30 %
" Weston's ... dis 20 %
" Moore's Triple Action ... dis 20 @ 25 %
Whitney's Hand Drill ... dis 20&10 %
Wilson's Drill Stocks ... dis 10 %
Automatic Boring Tools ... each $2.75, dis 20 %
Drill Chucks.—Morse's Beach Patent ... dis 30 %
" Adjust..each $10.00, dis 30 %
Danbury ... $8.00, dis 30 %

Egg Beaters.
Dover ... ₱ doz $5.00, dis 20 %
Family ... ₱ doz $3.00 net
National ... ₱ doz $4.50, dis 33⅓ %
Schofield ... ₱ doz $3.50

Elevator Buckets.
Mill E. Buckets, light, 5 to 10 inches, (Duc's Improved) ₱ 100 $23.00 @ $54.00, net
Mill E. Buckets, heavy, 5 to 10 inches (Duc's Improved) ₱ doz $5.60 @ $10.20, net

Emery.
Genuine Chester—Regular Nos ... ₱ lb 5¼c } dis.
" " Flour and FF ... ₱ lb 4 c } 10 %
Washington Mills—Regular Nos ... ₱ lb 8c
" Flour ... ₱ lb 5c
Wellington Mills, Grain ... ₱ lb 10c net
" " Flour ... ₱ lb 8c net
Hampden Emery Grain ... 5c net
" " Flour ... 3c net

Enameled and Tinned Ware.
Kettles ... dis 40 @ 50 %
Sauce Pans ... dis 30 @ 35 %
Tinned Sauce Pans ... dis 30 @ 35 %

Escutcheons.
Door Lock ... Same discounts as Door Locks
Brass Thread ... dis 60&10 %
Wood ... dis 25 %

Faucets.
Fenn's ... dis 50 %
Fenn's Cork Stops ... dis 40 %
Star ... dis 55&10 %
Frary's Patent Petroleum ... dis 20&10 %
Wood and Metallic ... dis 40 %
Metallic Key, Leather Lined ... dis 30&10 %
Cork Lined ... dis 65&10 %
Enterprise (Self Measuring) ... ₱ doz, $36.00, dis 20 %
Felloe Plates ... ₱ lb 15c, dis 50 %

Files.
American File Co ... $5.00 to £ currency, dis 30@35 %
Auburn ... $5.00 to £ currency, dis 25 %
Arcade ... $5.00 to £ currency, dis 30 %
G. & H. Barnett ... dis 25 %
Nicholson ... (Nicholson List) dis 35 %
Heller & Bros ... $5.00 to £ currency, dis 20 %
Madden & Cockayne File Co ... $5.00 to £ cur., dis 25 %
Jowitt's ... $4.50 to £ gold
J. & Riley Carr ... 4.50 to £ gold
Stubs' ... $7.00 @ 7.50 to £ gold
Butcher's ... 4.50 to £ gold
Walter Spencer & Co.'s "Diamond" ... 4.50 to £ gold
Fisher's ... 4.75 to £ gold
Moss & Gamble ... 4.50 to £ gold
H. Disston & Sons (new list) ... dis 35 %
Limet & Co. (French) ... $4.25 to £ gold
Boynton's Cant ... dis 40 %

Fluting Machines.
Knox, 4-inch Rolls ... $2.10 each net
" 6 " ... $2.50 each net
" 8 " ... 4.40 each net
Peerless, 4-inch Rolls ... 4.00 each net
" 5 " ... 4.75 each net
Eagle, 3½-inch Roll ... $30.00 ₱ doz, dis 45 %
" 5½ " ... 40.00 ₱ doz, dis 45 %
Empire ... $4.00 each net
Eureka, No. 1, 7-inch Roll ... 6.75 each net
" No. 2, 5-inch Roll ... 5.00 each net
Crown, 4½-in. Roll, $4; 6-in., $4.75; 8-in., $7.25 each, dis 45 %
Champion, 4 in., $2.15; 6-in., $2.50; 8-in., $4.00 each, net
Domestic Fluter ... 1.50 each net
Geneva Hand Fluter ... $15.00 ₱ doz, dis 10 %
Combined Fluter and Sad Iron ... ₱ doz 15.00, dis 15 %
Fluting Scissors ... dis 40&10 %

Forges.
"Empire" ... dis 20 %
Keystone Portable Forge Co ... dis 20 %

Forks.
Hay, Manure and Spading ... new list, dis 15 %
Plated A 1, Rogers & Bro ... dis 40&5 % cash
" Reed & Barton ... dis 40&5 %

Fruit and Jelly Presses.
Enterprise Mfg. Co ... dis 20 %

Fry Pans.
Burnished, P. S. & W., new list ... dis 60 %

No ...	0	1	2	3	4	5	6	7	8
₱ doz ...	$3.00	$3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00

Gauges.
Marking ... dis 45&10 %
" Star ... dis 35 %
Wire ... dis 10 %
" Smith's Patent ... ₱ doz $18.00, dis 40 %

Gimlets.
Nail and Spike ... dis 40@45 %
"Bee" Gimlets ... ₱ gross $12.00, dis 45 %
"Eureka" Gimlets ... dis 40 %
"Diamond" Gimlets ... dis 20&10 %
Double Cut, Shepardson's ... dis 40 %
" " Hartwell's ... dis 50 %
" " Ives' ... dis 40&10 %
" " Douglass' ... dis 40 %

Glue Pots.
Tinned and Enameled ... dis 40 %
Family, Howe's "Eureka" ... ₱ doz $1.00 dis 25 %
" L. F. & C.'s "Handy" ... dis 25 %

Grindstone Fixtures.
Sargent's Patent ... dis 70&10&10 %
Reading Hardware Co ... dis 40&10&2 %
" " "Keystone" ... dis 45&10&2 %
Hart Mfg. Co., Nos 9 to 11 ... dis 50&10 %
Rick Bros ... dis 45&5 %

Hammers.
Maydole's (new list on A. E. Bell Face) ... dis 15 %
Humason & Beckley Mfg. Co ... dis 33⅓ %
Cheney's Steel Face and Claw ... dis 10 %
" all Steel ... dis 20&10 %
Verree ... dis 5 %
Magnetic Tack ... dis 25&10 %
Warner & Noble's ... dis 10 %

Hand Cuffs and Leg Irons.
Providence Tool Co.'s Hand Cuffs, $15.00 ₱ doz } dis 10 %
" " Leg Irons, $25 ₱ doz }
Tower's ... dis 25 %

Handles.
Door or Thumb Latches—

Nos ...	0	1	2	3	4	
Per doz ...	$0.80	1.00	1.18	1.35	1.50	dis 65&10 %

Roggin's Latches ... 33c net
Bronzed Iron Drop Latches ... ₱ doz $0.85 @ $1.00 net
Jap'd Store Door Handles—Nuts, $1.40; Plate $0.95
no Plate, 75c ... net
Barn Door ... per doz $5.00, dis 65&10&10 %
Wrought Chest ... dis 60&10 %
Surface Chest, Sargent's list ... dis 60&10&10 %
Flush Chest ... dis 60&10&10 %
Lifting ... dis 60&10 %
Saw and Plane ... dis 35&10 %
Boynton's X Cut (Loop) ... dis 20 %
" " (Centennial) ... dis 15 %
Hammer and Hatchet ... dis 20 %
North Carolina Handle Co ... dis 20 %
Brad Awl ... ₱ gross $3.75, dis 25&10 %
Hickory Firmer Chisel, assorted, ₱ gross $5.25 }
" " large, " 6.50 }
Apple " " assorted, " 6.00 }
" " " large, " 7.50 }
Socket " " assorted, " 4.50 } dis 40 %
" Framing " assorted, " 7.00 }
File, assorted, ₱ gross ... 3.50 }
Auger, assorted, ₱ gross ... 6.00 }
" large, " ... 7.00 }
Patent Auger, Ives' ... dis 25&10 %
" Douglass' ... ₱ set $1.25, dis 10 %
" Swan's ... ₱ set $1, dis 20&10 %

Hangers.
Anti-Friction ... dis 50&5 %
Barn Door ... dis 70&10 @ 75&10 %
Novelty ... dis 40 %
Challenge ... dis 50 %
Climax (Anti-Friction) ... dis 50 %
Sterling Improved (Anti-Friction) ... dis 70&10 %
Cheritree ... dis 20 %

Harness Snaps.
Henshaw's ... List of 1¼ changed to $14.00, dis 50 %
Judd's ... " " 14.00, dis 50&10 %
Fitch's (Bristol) " 14.00, dis 50 %
Hotchkiss' ... dis 10 %
Andrews' ... dis 50 %
Sargent's ... dis 60&10 %
New York Wire ... dis 20&20 %
"German" ... dis 60 %

Hatchets.
Isaiah Blood ... dis 15 %
Shingling, Nos. 1 2 3 ... ₱ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3 ... ₱ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3 ... ₱ doz 7.50 8.00 8.50
Hunt's ... dis 25 %
Shingling, Nos. 1 2 3 ... ₱ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3 ... ₱ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3 ... ₱ doz 7.50 8.25 9.00
Hurd's ... dis 30&10 %
Shingling, Nos. 1 2 3 ... ₱ doz $8.00 $8.50 $9.00
Claw, Nos. 1 2 3 ... ₱ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3 ... ₱ doz 8.00 8.50 9.00
Simmon's ... dis 35 %
Shingling, Nos. 0 1 2 3 ... ₱ doz $7.50 $8.00 $8.50 $9.00
Claw, Nos. 1 2 3 ... ₱ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3 ... ₱ doz 8.00 8.50 9.00
Broad, Nos. 1 2 3 4 ... ₱ doz 9.00 10.00 12.00 14.00
" Nos. 5 6 7 8 ... ₱ doz 16.00 18.00 20.00 22.00
Collins' ... dis 10 %
Shingling, Nos. 1 2 3 ... ₱ doz $6.00 $6.50 $7.00
Claw, Nos. 1 2 3 ... ₱ doz 6.50 7.00 7.50
Lathing, Nos. 1 2 3 ... ₱ doz 6.00 6.50 7.00
D. R. Barton Tool Co ... dis 20 %
Shingling, Nos. 1 2 3 ... ₱ doz $11.00 $10.50 $10.00
Lath, Nos. 1 2 3 ... ₱ doz 10.50 10.00 9.50
Half Hatchets, Nos. 1 2 3 ... ₱ doz 11.00 10.50 10.00
M. H. Jones & Co ... dis 40 %
Shingling, Nos. 1 2 3 ... ₱ doz $8.00 $8.50 $9.00
Half Hatchets, Nos. 1 2 3 ... ₱ doz 8.00 8.50 9.00
Claw, Nos. 1 2 3 ... ₱ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3 ... ₱ doz 8.00 8.50 9.00
Broad, Nos. 2 3 4 ... ₱ doz 11.00 13.00 14.50
" Nos. 5 6 7 ... ₱ doz 16.50 18.00 19.50

Hay Knives.
"Lightning" ... ₱ doz $20.00 net
Wadsworth's ... dis 30 %

Hinges.
Gate, Western ... ₱ doz $6.25, dis 60&10 %
" N. E ... ₱ doz $10.13, dis 60&5&10 %
" N. E. Reversible ... ₱ doz $6.50, dis 60&10 %
Gate, Clark's No. 1 ... ₱ doz $6.00, dis 50 %
" N. Y. State ... ₱ doz $7.20, dis 60&10 %
" Automatic ... ₱ doz $12.50 dis 20&10 %
" Common Sense ... dis 20 %
" Seymour's ... dis 40&10 %
Rolled Blind Hinges ... dis 60&10 %
Rolled Plate ... dis 70&10 %
Rolled Raised ... dis 70&10 %
Wrought Strap and T, list Dec. 20, '77 ... dis 60&10 %
Plate Hinges { 6 to 10 in. 5½c ₱ lb } ... dis 10 %
"Providence" ... { over 10 in. 4¼c ₱ lb }
Screw Hook and Strap ... { 8, 10, 12 in., 11c / 14 to 36 in., 9½c } dis 40&10 %
Heavy Welded Hook ... { 8 to 12 in., 11 c / 14 in. & up, 9½c } .. dis 30 %
Screw Hook and Eye ... { ⅝ to 1 in., 11 c / ⅝ in. 11½c / ⅜ in. 13 c } ... net
Hoes.—Solid Shank, C. S ... ₱ doz $5.25, dis 15 %
Socket ... ₱ doz 5.75, dis 15 %
Riveted Eye ... ₱ doz
Grub ... dis 30 %
Planters' ... dis 35 @ 40 %
Scovill Pattern ... dis 25 @ 30 %
Handled Solid C. S. Shank ... dis 35 %
Planters', Handled ... dis 35 %
Scovill Pattern, Handled ... dis 35 %
Hick's Pat. Solid C. S. Planters' ... dis 20&10 @ 30 %
" " " Scovill Pattern. dis 20&5 @ 25 %

Hooks.
Bird Cage, Sargent's list ... dis 60&10&10 %
Cotton ... dis 50 %
Cotton (Humason & Beckley Mfg. Co.) ... dis 25 %
Belt ... dis 70 %
Bench—Hotchkiss' $5.00 ₱ doz ... dis 10 %
" Weston's, No. 1, $10.00; No. 2, $9.00 ₱ doz dis 25 %
" McGill's, $3.00 ₱ doz ... dis 10 %
" Skinner's, $6.25 per doz ... dis 20 %
Clothes Line, Hart's list ... dis 60&10&5&10 %
" Sargent's list ... dis 66⅔&10 %
" Reading list ... dis 45&10&2 %
Ceiling.. { Hart's list ... dis 70&10 %
Harness. { Sargent's list ... dis 70&10 %
{ Reading list ... dis 45&10&2 %
Coat and Hat, Hart's list ... dis 65&5&10 %
" " Sargent's list ... dis 66⅔&10 %
" " Reading ... dis 45&5&10&2 %
" " T. & S. Mfg. Co's list ... dis 25 %
Tassel (T. & S. Mfg. Co.) ... dis 40 %
Wrought Staples and Hooks and Staples ... dis 75 %
" Staples, Stanley's list ... dis 40 %
Wire Screw Hooks and Eyes ... dis 75&10 %
Grass and Bush ... dis 40 %
Whiffletree—Patent ... dis 40 %
Hooks and Eyes—Malleable Iron ... dis 60&10&10 %
" " Brass ... dis 60&10&10 %

Horse Nails.

	Nos. 5	6	7	8	9	10	
Ausable ... ₱ lb	30c	27c	25c	24c	23c	22c	dis 20 %
" Finished, Polished or Blued ...	31c	28c	26c	25c	24c	23c	
Bridgewater Iron Co. Pointed and Polished (Nos. 5 6 7 8 9 10)	26c	23c	21c	20c	19c	18c	
Cortland	29c	26c	24c	23c	22c	21c	dis 15
" P't'd & Blued	31c	28c	26c	25c	24c	23c	@ 25 %
Globe (New list)	26	23	21	20	19	18c	net
H. P. Pointed and Finished	26	23	21	20	19	18	dis 20 %
North Western Fini'h'd	26	23	21	20	19	18c	net
" " Plain	25	22	20	19	18	17c	net
National, Pointed and Polished, Pat. Fin.		25	23	22	21	20c	net
Putnam Hammer, P't'd	26	23	21	20	19	18c	net
Vulcan P't'd & Blued	26	23	21	20	19	18c	net

Horse Shoes.—Burden ... ₱ keg $3.37½
R. I. Horse Shoe Co., Perkins' Improved Light, Medium and Heavy ... ₱ keg 3.37½
Mule Shoes ... ₱ keg 4.87½
Perkins' Snow ... ₱ keg 4.87½

Ice Awls, Chisels, &c.
American Ice Chisel ... ₱ doz $6.50 net
National " ... ₱ doz $6.25, dis 20 %
Novelty Ice Breakers ... ₱ doz $6.25, dis 25 %
White's Sliding Head Picks ... ₱ doz $3.50 dis 40 %
Dunlap's Ring Picks ... ₱ doz 3.00, dis 25 %
Wood Head Picks, Sargent's ... ₱ doz $1.85, dis 60&10 %
Iron ... ₱ doz 1.85, dis 60&10 %
Ice Mallets, Pickin Head ... ₱ doz $1.75 net
" Pick in Handle ... ₱ doz 3.00 net
Ice Axes, Small Cast or Malleable ... ₱ doz 1.25 net
Kitchen Ice Tongs ... ₱ doz 2.25 net
Combination Ice Tools ... ₱ doz $2.50, dis 30&10 %

Kettles.
Brass, 7 to 13 inches inclusive ... ₱ lb 35c net
Brass, larger than 13 inches ... ₱ lb 40c net
Enameled ... dis 60 %

Knives.
Ames' Butcher Knives ... dis 20 %
" Shoe ... dis 15 %
" Bread ... ₱ doz $1.50, dis 15 %
Hay and Straw—"Wadsworth's" ... dis 30 %
Table and Pocket ... See Cutlery

Knobs.
Carriage (Jap'd 80c. ₱ gross) ... dis 60&10 %
Base—Common ... dis 30&10 %
" Plush Tip ... dis 10 %
" Elastic End. No. 8 ... dis 65&5 %
Door, Mineral / " Por. Jap'd / " " Plated / " " Por. } Same discounts as Door Locks.
Furniture, Plain ... 75c gross inch, dis 10 %
" Wood Screws ... dis 20 %
Picture (T. & S. Mfg. Co.) ... dis 50 %
" Sargent's ... dis 60&10 %

Ladles.
Melting—Hart's ... dis 55&10 %
" Sargent's ... dis 50&10 %
" Reading ... dis 15&10 %
" Monroe's Patent ... ₱ doz $4.00, dis 20 %

Lanterns.
Tubular ... No. 0, $10.00; No. 1, $12.50 / With Guards, 50c extra. } net
Hurricane ... dis 25 %
Peerless ... No 5, ₱ doz $11.75, dis 10&10 %
Brady's Patent ... dis 10&10 %
Ætna ... dis 10&10 %
Yankee ... dis 10&10 %
De Beque ... dis 10&10 %
Police ... Small, $7.50; Med., $9.00; Large, $12.00, dis 20 %

Lard Presses.
Draw Cut, 14 inch ... each $65.00, dis 20 %
Enterprise Mfg. Co ... dis 20 %

Lemon Squeezers.
Porcelain Lined ... ₱ doz $4.00 net
Eureka, Tinned ... ₱ doz $10.00, dis 10 %
Dunlap's Improved ... ₱ doz $4.00 net
Sammis' Patent ... No. 1, $7.50; No. 2, $12.00 ₱ doz ... dis 25&10 %
Lines.—Linen Fish ... dis 25 %
Cotton Chalk ... dis 50 %
Sil. Lake Chalk ... Nos. 0, 1, 2, 3, $6.00, $6.50, $7.00, $7.50 ... dis 20 %
Mason's Linen ... dis 20 %
Wire Clothes, Gal'd ... each 35 @ 43c net

Locks and Latches.
Cabinet—Gaylord / " Eagle } ... dis 25&2 %
" Barnes & Deitz ... dis 30 %
" Bridgeport Lock Co ... dis 25&2 %
Trunk ... dis 25 %
Langstroth & Crane's List Jan. 1, '77.
Round Key ... dis 40&10 %
Flat Key ... dis 33⅓&10 %
Barnes & Deitz, Flat Key ... dis 30 %
Yale Lock Co., Flat Key ... dis 40 %
Shepardson's, Flat Key ... dis 35 %
American Lock Mfg. Co ... dis 33⅓ %
Plate ... dis 33⅓&5&2 %
F. Many's "Extension Cylinder" ... $10.50 ₱ doz, net
DOOR LOCKS, &C.
Branford ... dis 60&10&2 %
Norwalk ... dis 50&10&2 %
Norwich ... dis 50&10&2 %
Russell & Erwin ... dis 60&10&2 %
Mallory, Wheeler & Co ... dis 35&10&2 %
Reading Hardware Co ... dis 35&10&2 %
Padlocks—Russell & Erwin / " Mallory, Wheeler & Co / " Wm. Wilcox & Co } ... dis 33⅓&5 % and 2 % for cash
" D. K. Miller Lock Co ... dis 25 %
" American Lock Mfg. Co ... dis 33⅓ %
" Romer's ... dis 30 %
" Vulcan Hardware Co ... dis 20 %
" J. H. McWilliams ... dis 10 %
" Barnes & Dietz ... dis 30 %
" Penn Lock Works ... dis 30 %

Mallets.—Hickory and Lignumvitæ ... dis 10&10 %

Meat Cutters.
Dixon's (P. S. & W.) Nos. 1 2 3 4
₱ doz .. $14.00 17.00 19.00 30.00—dis 25 %
Miles' Challenge ... Nos. 1 2 3
₱ doz .. $22.00 30.00 40.00—dis 30 %
Perry's Nos. 1 2 3 4 4 g'rd 5 g'rd
Each .. $3.00 4.00 5.00 11.00 13.00 36.00—dis 20&10
Woodruff's (P. S. & W.) ... Nos. 100 150
₱ doz .. $15.00 18.00—dis 20&10 %
Hales' ... Nos. 11 12 13
₱ doz .. $33.00 40.00 51.00—dis 50&2 %
Draw Cut ... Nos. 5 2 6 8 10
Each .. $50.00 75.00 80.00 225.00 400.00—dis 20 %
American ... dis 25 %
Nos ... 1 2 3 4 B 5
Each ... $5.00 7.00 10.00 25.00 50.00 60.00

Molasses Gates.
Stebbins Pattern ... dis 62½&10 %
" Genuine ... dis 60&10 %
" Tinned Ends ... dis 40&10 %
Chase's Hard Metal ... dis 30 %
Bush's ... dis 20 %
Lincoln's Genuine ... dis 60 %
Weed's ... dis 15 %

Mortars and Pestles.
Iron ... net
Mortising Machines ... each $20.00, dis 20 %
Nails ... See Trade Report

Nuts and Washers.
Square and Hexagon ... 7c off list

Nut Crackers
Table (Humason & Beckley Mfg. Co.) ... dis 33⅓ %
Blake's Pattern ... ₱ doz $2.35, dis 10 %

Oakum.
Best ... ₱ lb 9¼c
U. S. Navy ... ₱ lb 8¼c
Navy ... ₱ lb 7½c
Oilers.—Zinc and Tin ... dis 45 %
Brass and Copper ... dis 40 %
Olmsted's ... dis 40 %
Broughton's ... dis 40 %
Malleable (Hammer's) ... ₱ doz $5.00, dis 10 %
Prior's Patent or "Paragon" ... dis 40 %
Ox Balls ... dis 60&10 %

Pencils.
Faber's Carpenters' ... dis 10 %
" Round Gilt ... ₱ gross $5.25 net
Dixon's Lead ... ₱ gross 4.50 net
" Lumber ... ₱ gross 7.50 net

Peach Parers.
Lightning ... ₱ doz $12.00, dis 10 %

Picture Nails and Knobs.
Brass Head, Sargent's List ... dis 50&10&10 %
Porcelain Head " ... dis 50&10&10 %
" " Judd's List ... dis 40 %
Porcelain Head, T. & S. Mfg. Co ... dis 40 %
Pinking Irons ... ₱ doz $2.75, dis 70&5 %

Plaiting Machines.
Magic ... ₱ doz $10.00, net
Astor Plaiting Machine ... each $15.00, dis 20 %
Crown Plaiting Machines ... dis %
6in., $6.00. 10in., $10.00, each.

Planes and Plane Irons.
First Quality ... dis 35&10 %
Second " ... dis 50&10 %
Bailey's Patent Adjustable, new list Jan. '77, dis 25&10 %
Bailey's "Victor" " " dis 25&10 %
Defiance Adjustable, new list ... dis 25&10 %
D. R. Barton Tool Co ... dis 20 %
Plane Irons, Butcher's ... $5.50 to £ gold
" Buck Bros ... $5.00 to £ gold
" Bailey's Patent ... dis 25&10 %
" Auburn Tool Co.'s ... dis 25 %
" Defiance ... dis 25&10 %
" D. R. Barton Tool Co ... dis 20 %
" Middletown Tool Co ... dis 10 %
" Ohio Tool Co ... dis 10 %
" Spear & Jackson's ... $5.00 to £ gold
" Sandusky Tool Co ... dis 10&10 %

Pliers and Nippers.
Button's Patent ... dis 33⅓ %
Hull's Patent Nippers, No. 1, $15; No. 2, $21 ₱ doz, dis 25 %
Humason & Beckley Mfg. Co ... dis 33⅓ %
Gas Pliers ... dis 30&10 %
Eureka Pliers and Nippers ... dis 25 %
Russell's Parallel ... dis 25 %
P. S. & W. Cast Steel ... dis 30 %

Plumbs and Levels.
Disston's ... dis 60&10 %
Stanley R. & L. Co.'s Pat. Adjustable ... dis 60&10 %
" " " Non-Adjustable ... dis 60&10 %
Chapin's ... dis 60&10 %
Standard Rule Co.'s New Adjustable ... dis 60&10 %
" " Non-Adjustable ... dis 60&10 %
Johnson's Patent Adjustable ... dis 60&10 %
Davis' Patent ... dis 60&10 %
Pocket Levels ... dis 60&10 %

Post Hole and Tree Augers.
Samson Post Hole Digger ... per doz $36.00, dis 20 %
Fletcher Post Hole Augers ... ₱ doz 36.00, dis 20 %
Vaughan's Post Hole—
6 in. $23.60; 7, 8 and 9 in. $25 per doz ... dis 20 %
Leed's ... $5.00 each, dis 35 %

Potato Parers, &c.
Bay State ... ₱ doz $13.00 dis 10 %
"Saratoga" Peeler and Slicer ... ₱ doz 7.75 dis 10 %

Pruning Hooks.
Disston's Combined Pruning Hook and Saw per doz $18.00, dis 20 %
" Pruning Hook ... " 11.50, dis 20 %

Pulleys.
Judd's Axle ... ₱ doz $0.50, dis 20&10 %
Hot House and Tackle ... dis 66⅔&10 %
Jap'd Screw ... dis 66⅔&10 %
Brass Screw ... dis 60&10 %
Jap'd Side ... dis 66⅔&10 %
" Clothes Line ... dis 66⅔&10 %
Hay Fork Solid Eye, $4.50; Swivel, $5.00, dis 40&10&10 %
" "Anti-Friction," ... $9.00, dis 40&10&10 %

Punches.
Belt or Drive ... ₱ doz $2.00; 2.25; 2.50, dis 30
Spring ... ₱ doz $7.00, dis 10 %
" Leach's Patent ... dis 15 %
" Bemis' ... dis 20 %
Solid, Tinners' ... ₱ doz $1.44, dis 30 %

Rail.
Sliding Door, Wrought Brass ... ₱ lb 40c dis 10 %
" " Iron, Painted .. ₱ foot 9c, dis 55&10 %
Barn Door, ½, ⅝ and ¾ inch ... dis 75&10 %
" for N. E. Hangers ... dis 70&10 %

Rakes.
Cast Steel ... dis 15 %

8	10	12	14	16 teeth.
$5.00	5.75	6.50	7.25	8.00

Malleable ... dis 15 %

10	12	14 teeth.
$3.60	4.00	4.40

Razor Straps.
Genuine Emerson ... dis 30@33⅓ %
Badger's Emerson ... dis 20 %
Badger's (not Emerson) ... dis 25 %
Evans ... dis 40 %
Imitation Emerson ... ₱ doz $2.75, dis 40&10 %
Hunt's ... dis 40&5 %
Chapman ... dis 10 @ 15 %
Torrey's ... dis 20 %
Saunder's ... dis 10 @ 15 %

Rivets.
Iron and Tinned ... dis 50 %
In bulk, new list of Jan. 10, 1878 ... dis 40 %
Copper Rivets and Burs ... dis 10 %

Nos.	7	8	9	10	11	12	13	14	15
₱ lb	49c	50c	52c	54c	56c	58c	60c	65c	70c

Rivet Sets ... dis 40 %

Road and Levee Scrapers.
Doty's Revolving ... dis 25 %

Rods.
Stair ... dis 50 %
" American Patent ... dis 33⅓ %

Rollers.
Barn Door, Sargent's list ... dis 70&5&10 %
Novelty ... dis 10 %
Acme (Anti-Friction) ... dis 50 %

Rope. Manufacturers' List, Jan. 2, 1878
Manila ... ½ inch and larger ₱ lb 12½c
" ... ⅜ inch ₱ lb 13 c
" ... ¼ and 5-16 inch ₱ lb 13½c
" Tar'd Rope ... ₱ lb 12 c
" " Lath Yarn ... ₱ lb 13½c
" Hay Rope ... ₱ lb 12½c
Sisal ... ½ inch and larger ₱ lb 11 c
" ... ⅜ inch ₱ lb 11½c
" ... ¼ and 5-16 inch ₱ lb 12 c
" Hay Rope ... ₱ lb 11 c

Rules.

	Boxwood.	Ivory.
Chapin's	dis } dis 60, 10&10 %	dis 50&10 %
Stanley	dis }	dis 50&10 %
Standard	dis }	dis 50&10 %
Stephens'	dis }	dis 50&10 %
Willis, Thrall & Son	dis }	dis 50&10 %
Stearn's	dis 50&10 %	dis 40&10 %

Sad Irons.
From 4 to 10 lbs ... ₱ lb 2¾c net
Self-Heating ... ₱ doz $8.75 net
" Tailors' ... ₱ doz $17.50 net
Gleason's Shield and Toilet ... dis 25 %
Enterprise Patent Cold Handle ... dis 33⅓ %
Mrs. Pott's Pat. Cold Handle, "Crown" ... dis 33⅓ %
Combined Fluter and Sad Iron .. per doz $15.00, dis 15 %

Sand Paper.
Baeder & Adamson's Flint, 00 to 1½ .. $4.25 ₱ ream }
" " " 2, 2½ & 3. 4.75 ₱ ream } dis
" " " Assorted 4.25 ₱ ream } 15@
" " Star ... 3.25 ₱ ream } 20 %
" " Emery .. ₱ ream $6.50 @ 11.50 }
New England, same list as B. & A. Flint .. dis 15@20 %

Sash Cord.
Common ... ₱ lb 16 @ 18c net
Patent ... ₱ lb 18c net
Silver Lake Russia Flax ... ₱ lb 55c net
" White Cotton ... ₱ lb 55c net
" Drab Cotton ... ₱ lb 60c net
Raw Hide ... dis 25 %
Steel Ribbon ... dis 10 %

Sash Locks.
Clark's, No. 1, $10.00; No. 2, $8.00 per gross ... dis 40@45 %
Ferguson's ... dis 33⅓ %
Walker's ... dis 10 %
Hammond's Window Springs ... dis 25 %
Northup Window Springs ... $9.00 per gross, dis 10 %
Sash Weights.—Solid Eyes ... ₱ lb 1½c

Sausage Stuffers or Fillers.
Miles ... ₱ doz $20, dis 30 %
Perry ... ₱ doz, No. 1, $15; No. 0, $21, dis 30 %
Draw Cut No. 4 ... each $30.00, dis 20 %
Enterprise Mfg. Co ... dis 20 %
Silver's ... dis 25 %

Saws.
Disston's Circular ... dis 30 %
" Mill ... dis 30 %
" Cross Cut ... dis 20 %
" Hand, Panel, Rip, &c ... dis 20 %
H. W. Peace's Circulars ... dis 25 %
" Mill, Gang and Mulay ... dis 25 %
" Cross Cut, Wood, Hand, &c ... dis 20 %
E. M. Boynton's Lightning, Cross Cuts ... dis 50&5 % }
" One-Man, all lengths ... dis 40&5 % }
" Buck Saws (X Bar) .. ₱ doz $15, dis 40&10 % } 5 % cash
" Billet Webs ... ₱ doz $10, dis 40&5 % }
" Pruning ... dis 40 % }
Wheeler & Clemson Mfg. Co.'s Hand ... dis 20 %
" " Cross-Cut ... dis 35 %
Livingston's Butcher and Kitchen ... dis 20 %
" Framed Wood—

Nos ...	101	102	103	104	105	
Per doz ..	$10.00	8.50	10.00	7.50	6.25	net

Saw Frames.
White, Vermont ... ₱ doz $1.35, dis 15 %
Red, Polished and Varnished ... ₱ doz $2.00, dis 15 %
Saw Rods ... $10 list dis, 10&10 %

Saw Sets.
Boynton's Patent ... dis 40 %
Stillman's Genuine ... ₱ doz $4.25 net
" Imitation ... ₱ doz $3.25, dis 25 %
Common Lever ... per doz $2.00, dis 25 %
Leach's ... No. 0, $8.00; No. 1, $15.00, dis 15 %
Nash's ... No. 1, $8.50; No. 2, $5.50, dis 20&10 %
Hammer, Hotchkiss ... $5.50, dis 10 %
" Bemis & Call' Co.'s New Pat ... dis 20&30 %
Bemis & Call Co.'s Spring Hammer, New Pat. Lever .. dis 20&10 %
" Aiken's Genuine ... $13.00, dis 40&10 %
" " Imitation ... $7.00, dis 40 %
" Hart's Patent Lever ... dis 20 %

Scales.
Hatch, Counter ... ₱ doz $36, dis 40 %
" Tea ... ₱ doz $15, dis 40&10 %
Union Platform ... $6.00, $7.00, dis 45 %
Turnbull's ... dis 20 @ 25 %
Brown's ... dis 25&5 %

Fairbanks'......dis 20&5 %
Howe's......dis 20&5 %
Chatillon's Grocers'......dis 25 %
" Eureka......dis 20 %
Universal Family......dis 25 %
Favorite Family......dis 25 %
Scale Beams, Chatillon's list......dis 25 %
" Sargent's list......dis 60&10 %

Scrapers.
Box, 1 Handle......₩ doz $5.00, dis 10 %
" 2 "......₩ doz 6.00 dis 10 %
Defiance Box and Ship......dis 25&10 %
Foot......dis 60&10 %
Ship (common)......per doz $3.00 net
" (Providence Tool Co......dis 10 %

Screw Drivers.
Hart, Bliven & Mead, new list......dis 45&10 %
Douglass Mfg. Co......dis 35&10 %
Disston's......dis 45 %
Disston's Patent Excelsior......dis 60 %
Buck Bros......dis 25 %
Stanley Rule & Level Cos., Black Handles...dis 35&10 %
" " " Varnished H'le..dis 45&10 %
Sargent & Co.'s......dis 60&10 %

Screws.
Flat H'd Iron list Sept. 1, '75......dis 55 %
Round Head Iron "......dis 45 %
Flat Head Brass, list Sept. 1, '75......dis 50 %
Round Head Brass. list Sept. 1, '75......dis 35 %
Brass and Silver Capped......dis 40 %
Japanned, list of Plain Screws......dis 45 %
Lag or Common Coach......dis 65 %
Coach, Patent Gimlet Point......dis 40 @ 45 %
Bed......dis 10 %
Machine, Flat Head, Iron, Am. Screw Co......dis 25 %
" Round Head, Iron, " "......dis 20 %
Bench, Iron......dis 55&10 %
" Wood, Beach......₩ doz $3.00, net
" " Hickory......dis 20&10 %
Hand......dis 25&10 %
Hand Rail, Sargent's......dis 60&10 %
" " Humason, Beckley & Co.'s......dis 40&10 %
Jack, Bell Bottom......dis 20 %
Jack (Wilson's)......dis 30 %
Sash (T. & S. Mfg. Co.)......dis 25 %

Scythes.
Blood German Steel, Grass.....₩ doz $10.00 }
" Cast, " " .....₩ doz 11.00 } dis $1.50
" Silver " " .....₩ doz 12.00 } from list
" German " Grain.....₩ doz 14.00 }
" Cast " " .....₩ doz 15.00 }
Excelsior and Granger..₩ doz 11.00 }
Young America......10.50 } dis $1.50 from list
Silv Clipper......13.00 }
Wadsworth's Grass......dis 40 %
" Bush......dis 20 %
Scythe Snaths......dis 25

Shears and Scissors.
Cast Steel......dis 75 & 10 %
" Iron, 'American"......dis 45&5 %
Seymour's Straight Trimmers......dis 65 %
" Scissors......dis 65 %
Pruning......₩ doz $4.75 @ $5.50 net
Barnard's Lamp Trimmers......₩ doz $3.75
Tinners'......dis 20 %

Sheep Shears.
Ball's Pat. Solid Steel Bent......gold, net

Inches	5	5½	6
Per doz	$8.25	$8.75	$9.25

Sheaves.
Sliding Door, M. W. & Co., list......dis 35&10&2 %
" R. & E. list......dis 50&2 %
" Patent Roller......dis 25&2 %
" " " Hatfield's......dis 50&2 %
" Russell's Anti-Friction......dis 50&2 %
Sliding Shutter, R. & E. list......dis 50&2 %
" " Sargent's list......dis 55&10 %
Moore's Anti-Friction......dis 45 %

Shovels and Spades.
Ames......dis 32½ %
" not stamped "Ames"......dis 37½ %
Rowland's......dis 50 %
Kimball Shovel Co......dis 20 @ 20&5 %
Old Colony......dis 30 %
Middleboro' Shovel Co......dis 30 %
Remington's (Lowman's Patent)......dis 30 %
Dunning's Shovels and Scoops......dis 20&7½ %
B. Rowland & Co., Anchor Brand......dis 50 %
" " Patent......dis 40 %
Oxford Patent......dis 40 %

Shovels and Tongs.
Iron and Brass Head, R. & E. list......dis 50&2 %
" " Hart's......dis 50&10&2 %
Polished Steel......dis 50&2 %

Slates.
Square Frames, Round Cornered, by case......dis 70 %
Less than a case......dis 65&10 %

Spoke Shaves.
Defiance Metallic......new list, dis 25&10 %
Iron......dis 33⅓&10 %
Wood......dis 30 %
Bailey's......dis 25&10 %

Spoke Trimmers.
Bonney's......₩ doz $10.00, dis 40 %
Stearn's......₩ doz $10.00, dis 40 %
Ives'......No. 1, $15.00; No. 2, $12.00 ₩ doz, dis 40&10 %
Douglass'......₩ doz $9.00, dis 20&10 %

Spoons.
Tinned Iron......dis 15 %
Basting......dis 30 %
Britannia......dis 60 %
Derby Silver Co......dis 40&5&5 %
L Boardman's Sons, A1......dis 40&5&5 %
Rogers & Bro., A 1......dis 40&5 % cash
Reed & Barton......dis 40&5 %
Rogers Cutlery Co......dis 40&5&5 %
Hall & Elton......dis 40&5 %
Holmes, Booth & Haydens......dis 40&5 %
German Silver (Hall & Elton)......dis 30&5 %
German Silver (L. Boardman's Sons)......dis 30&5 %
Diamond Steel (L. Boardman's Sons)......dis 30&5 %
Tin (P. S. & W.), Teas......$1.50 ₩ gross, net
" " Tables......$2.50 ₩ gross, net
Tin Cowles Hdw. Co.)......dis 10 %
" " " case lots......dis 20 %

Stocks and Dies......dis 5&10 %

Stone.
Hindostan Stone......₩ ℔ 6c }
" Ax Stone......₩ ℔ 8c } dis 30&10 %
" Slips......₩ ℔ 10c }
Sand Stone......₩ ℔ 6c, dis 30&10 %
Washita Stone (Boyd & Chase)......No. 1, ₩ ℔ 25c }
" " ......No. 2, ₩ ℔ 20c }
" Slips, " ......No. 1, ₩ ℔ 50c } dis 10 % @ net
Arkansas Stone, " ......No. 1, ₩ ℔ $1.35 }
" Slips, " ......No. 1, ₩ ℔ $2.50 }
Turkey Oil Stone......4 to 8in, $1.00 ₩ ℔, dis 10 %
" Slips......$2.50 ₩ ℔, dis 10 %
Grindstones, Family, Loring's......dis 10 %

Stove Polish.
Joseph Dixon's......₩ gross $6.00, dis 5 %
Gem......₩ gross $4.50, dis 5 %
Ruby......₩ gross $3.75, net
Gold Medal......₩ gross $6.00, dis 25 %
Rising Sun......₩ gross $5.75, net

Squares.
Steel......dis 50 %; full cases, dis 50&10 % }
Iron......dis 50 %; full cases, dis 50&10 % } 2 % cash
Nickel Plated......add $2.50 @ $4.00 ₩ doz, net }
Try Squares and T Bevels......dis 45&10 %
Star Try Squares and Bevels......dis 35 %
Disston's Try Squares and T Bevels......dis 45 %
Winterbottom's Try and Mitre......dis 20&10 %
Bailey's Try Squares and T Bevels......dis 25&10 %

Tacks, Brads, &c.
List of May, 1878......dis 50 %
Double-Pointed Tacks......dis 40&5 %

Tap Borers.
Common and Ring......dis 20&10 %
Ives' Tap Borers......dis 10&10 %
Enterprise Mfg. Co......dis 20 %

Tapes, Measuring.
American Flask and Cap Co......dis %
Eddy's......dis 5 %
Spring Tapes......dis 25&10 %

Thermometers.
Tin Case......dis 60&10&10 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion)......dis 20 %
Wood Bottom......₩ doz $12.00, dis 30&10 %
All Iron......₩ doz $10.50, dis 40&5 %
Nashua Lock Co.'s......₩ doz $18.00, dis 50 %

Toe Calks.—Winsted......₩ ℔ 10c. dis 10 %

Tinners' Tools and Machines.
Machines (P. S. & W.)......dis 5@10 %
Tools (P. S. & W.)......dis 15@20 %

Traps.
Game, Newhouse......dis 30 %
" Newhouse Pattern......dis 60 %
" Blake's Patent......dis 40&10 %
Mouse, Wood, Choker......₩ doz holes, 13½c
" Patent Choker (Union Nut Co)......₩ doz holes, 16 @ 18c, net
" Round Wire......₩ doz $1 50, dis 10 %
" Cage......₩ doz $2.50, dis 10 %
" Patent Self Setting......₩ doz holes, 25c, net
" Catch-em-alive......₩ doz $3.50, dis 10 %
Rat, "Decoy"......per doz $10.00, dis 10 %

Trowels.
Lothrops Brick and Plastering......dis 10 %
Disston's Brick and Plastering......dis 20 %
Peace's Plastering......dis 20 %
Clement & Maynard's......dis 20 %
Rose's Brick......dis 15 %
Brades' Brick......gold, dis 20 %
Worrall's Brick and Plastering......dis 20 %
Garden......dis 40 %

Triers.
Butter and Cheese......dis 25 %

Tuyere Irons.
Vulcan Pattern......$3.50 each, net

Vises.
Solid Box, Trenton......40 to 160 lbs.. 12½c, net
" Wilsons......32 to 160 lbs., 10c, net
" "Crown" (A. H. Hildicks) 40 to 100 lbs., 15c currency, dis 20 %
" Peter Wrights......13½c, gold
Parallel, Parker's......dis 20 %
" Wilson's......dis 50 %
" Howard's......dis 25 %
" Sargent's......dis 60&10 %
" Trenton......dis 25 %
" Backus and Union......dis 25 %
" Merrill's......dis 15 %
" Fisher & Norris......dis 15&10 %
" Buffalo......dis 25 %
" Stevens'......dis 25 %
" Simpson's Adjustable......dis 25 %
Saw Filers, Bonney's......₩ doz $24.00, dis 20&10 %
" Stearn's......dis 20&10 %
" Hopkins'......₩ doz $17.50, dis 10 %
Lowell Hand Vises......dis 20 %

Ventilators.
Protective (upper) per foot, $1.00...... } dis 25 %
" (lower) " 1.50...... }

Washer Cutters.
Smith's Patent......₩ doz $12.00, dis 10 %
Johnson's......₩ doz $12.00, dis 25 %
Penny's......₩ doz $14.00 and $16.00, dis 20&10 %
Appleton's......₩ doz $8.00, dis 10&10 %

Washers.—See Nuts and Washers.

Weather Strips.
Protective Ventilator Co. s......dis 25 %

Well Wheels.—Revised list......dis 60&10 %

Wire.
Brass and Copper......List of Jan. 1, 1878 dis 10 %
Bright and Annealed......Nos. 0 @ 18, dis 52½ @ 55 %
" " ......Nos. 19 @ 26, dis 57½ @ 60 %
" " ......Nos. 27 @ 36, dis 62½ @ 65 %
Coppered......Nos. 0 @ 18, dis 47½ @ 50 %
Galvanized, Nos. 0 to 6......₩ ℔ 10c, dis 30 @ 35 %
" Nos. 7 to 18......market list, dis 30 @ 35 %
Tinned, Nos. 0 to 18......dis 45 @ 47½ %
Cast Steel......dis 25 @ 30 %
Tinned Broom Wire, Nos. 18 to 25......dis 47½ @ 50 %
Annealed Fence, Nos. 8 and 9......dis 55 @ 57½ %
" Grape, Nos. 10 to 14......dis 55 @ 57½ %
Galvanized Telegraph, Nos. 7 to 9......₩ ℔ 8½c
" " Nos. 10 and 11......₩ ℔ 9½c
" " No. 12......₩ ℔ 10c
Fence Staples......₩ ℔ 7 @ 7½c
" Staples, Galvanized......₩ ℔ 9½ @ 10c
Stubs Steel Wire......$7.00 to £ gold
Japanned Barb Fence......₩ ℔ 15c
Galvanized "......₩ ℔ 16c
Steel Music Wire, Nos. 12 to 27......₩ ℔ $1 00. net
Judd's Picture Wire......dis 80&20 %
Clothes Line Wire. Galvanized......₩ coil 35 @ 43c net

Wire Cloth.
Clinton, green or drab, by the roll, per sq. ft. 3¼c net

Wrenches.
American Adjustable......dis 45 %
Baxter's Adjustable "S,"......dis 20 %
" Diagonal......dis 20 %
Collins & Co.'s......dis 45 %
Coes' Genuine......dis 50&10 %
" Pattern (Wrought)......dis 60&10 %
" " (Malleable)......dis 75&10 %
Girard......dis 50&10&10 %
Lindsay's "......dis 25 %
Taft's Pattern......dis 75&10 %
Davis' Patent Duplex......new list, dis 25 %
Bemis & Call's Patent Combination......dis 25 %
" " Merrick's Pattern......dis 25&2½&20 %
" " Briggs' Pattern......dis 25&10 %
" " Cylinder or Gas Pipe......dis 25&30 %
Aiken Pocket (Bright)......$8.00, dis 50&10 %

Wringers. Per doz.
Universal, Cog Wheels, No. 2½......$60.00
" " " No. 2......63.00
" " " No. 1½......71.00
Crown No. 2......54.00
" No. 2½......63.00
" No. 3......69.00
Eureka, No. 1......57.00
Novelty, No. 10, with Cog Wheels......60.00
" No. 2, " "......63.00
Excelsior, No. A, with Folding Bench......84.00
" No. E, for Set Tubs......66.00
Keystone No. 1, Wood Frame, no Gear......54.00
" No. 2, Iron " "......54.00
" No. 10, Wood " Common Gear......60.00
Peerless, No. 2......63.00
" No. 3......71.00
" No. 2½......60.00

Stamped Tinware.
Common Stamped Ware, L. & G. List, April, 1878, dis 50&10 %
Stamped Deep and Retinned Ware, L. & G. List, April, 1878......dis 50&10 %

METALS.

IRON.—Duty: Bars, 1 to 1½c. ₩ ℔; Sheet, Band Hoop and Scroll, 1½ to 1¾c. ₩ ℔; provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 ₩ ton; Polished Sheet, 3c. ₩ ℔; Wrought Scrap, $8 ₩ ton; Cast Scrap, $6 per ton. Railroad 70c. ₩ 100 ℔s. Boiler and Plate, 1½c. ₩ ℔.

Pig Iron—AMERICAN.
Foundry No. 1......₩ ton $16.50 @ 18.00
" No. 2......₩ ton 15.50 @ 17.00
Gray Forge......₩ ton 14.50 @ 16.00

SCOTCH.
Glengarnock......₩ ton 23.75
Eglinton......₩ ton 22.75
Coltness......₩ ton 24.00

Rails.
Iron, at mill......₩ ton $32.00 @ 36.00
Steel, "......₩ ton 43.00 @ 44.00
Old Rails......₩ ton 18.00

Scrap.
Wrought Scrap, from yard..₩ ton, nom. 21.00 @ 22.00

Bar Iron, from Store.
Common Iron:
¾ to 2 in. round and square...... } ₩ ℔ 1 75c
1 to 6 in.x⅜ to 1 in...... }
Refined Iron:
¾ to 2 in. round and square...... } ₩ ℔ 2.00
1 to 6 in.x⅜ to 1 in...... }
1 to 6 in.x¼ and 5-16......₩ ℔ 2.2c
Rods—⅝ and 11-16 round and square......₩ ℔ 2.1c
Bands—1 to 6x3-16 to No. 12......₩ ℔ 2.4c
Swedish Iron:
Ordinary sizes......5c

Sheet Iron.

	Common American.	R. G. American.
Nos. 10 to 20	₩ ℔ 2⅞c	4
21 to 24	₩ ℔ 3 c	4
25 to 26	₩ ℔ 3⅛c	4¼
27	₩ ℔ 3¼c	4¼
28	₩ ℔ 3⅜c	4½c

Galvanized, 14 to 20, B. B. ₩ ℔ 6⅛c; 2d qual. ₩ ℔ 5½c
" 21 to 24, " ₩ ℔ 7⅛c; " ₩ ℔ 6 c
" 25 to 26, " ₩ ℔ 7⅝c; " ₩ ℔ 6½c
" 27 " ₩ ℔ 8⅛c; " ₩ ℔ 7 c
" 28 " ₩ ℔ 9 c; " ₩ ℔ 7½c
Patent Planished......₩ ℔ A, 10½c; B, 9½c
Russia, Nos. 8 to 16......₩ ℔ 11 @ 11¼c
American Cold Rolled......₩ ℔ 4½c

COPPER.—Duty: Pig, Bar and Ingot, 5c; Old Copper, 4c ₩ ℔; Manufactured (including all articles of which Copper is a component of chief value), 45 % ad valorem.
American Ingot......₩ ℔ See Trade Report.

SHEATHING, BRAZIERS' COPPER, BOLTS, &C.
Braziers' Copper, ordinary sizes, over 16 oz., ₩ sq. ft......₩ ℔ 28c
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., ₩ sq. ft......₩ ℔ 30c
Braziers Copper, 10 oz and 12 oz., ₩ sq. ft......₩ ℔ 32c
" " Lighter than 10 oz. ₩ sq. ft......₩ ℔ 34c
Circles less than 84 in. in diameter......₩ ℔ 31c
Circles 84 in. diameter and over......₩ ℔ 34c
Segment and Pattern Sheets......₩ ℔ 31c
Locomotive Fire Box Sheets......₩ ℔ 28c
Sheathing Copper, over 12 oz. ₩ sq. ft......₩ ℔ 26c
Bolt Copper......₩ ℔ 28c
Copper Bottoms......₩ ℔ 30c
No Copper is Sheathing except 14x48 inches and not to exceed 34 oz. to the sq. ft.

TINNING.
14x48, by the case......₩ sheet 6c
14x48, less than case......₩ sheet 8c
For tinning both sides, double the above amount.

O'NEILL'S PATENT PLANISHED COPPER.
14x48.
14 and 16 oz. and heavier..₩ ℔ 34c By the case. ₩ ℔ 33c
12 oz. and lighter......₩ ℔ 37c " " ₩ ℔ 36c

Boiler Sizes.
7 in., 14x52. 8 in., 14x56. 9 in., 14x60.
14 and 16 oz. and heavier. ₩ ℔ 36c By the case. ₩ ℔ 35c
(And all sizes not over 20 in. wide.)
30x60.
14 and 16 oz. and heavier......₩ ℔ 38c
12 oz......₩ ℔ 41c

Brass.
Brown & Sharp's Gauge the Standard for Meta; Old English Gauge the Standard for Wire.

BRASS MANUFACTURERS' PRICE LIST.
January 1, 1878.
Cash prices for Roll and Sheet Brass. For less quantity than 100 ℔s. add 3c ₩ ℔.

HIGH BRASS.
All Nos. not thinner than to No. 28, wider than 2 in., not wider than 14 in......27c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive......33c
All Nos. to No. 28, inclusive, and widths over 20 to 30 in., inclusive......37c
½c. ₩ ℔ advance on each No. above Nos. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass, at...50c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in. 36c
Printers' Rules......44c
Sheets wider than 30 in. and under 40 in......45c
" " 40 in. and over......47c
Circular Sheets, in diam. from 4 in. to 14, inclusive. 39c
" " over 14 " 20, "......44c
" " " 20 " 30, "......48c
" " " 30 " 40, "......51c
" " " 40 in......54c

LOW BRASS.
4c ₩ ℔ more than High Brass.
Gilding Metal, 8c ₩ ℔ more than High Brass.
Platers' or Gold Metal { In Bars......46c
{ Sawed......49c
{ Planed or Polished......52c

FOR SLITTING.
Metal in width 2 in. to ⅛ in. to No. 28, inclusive, 1c. ₩ ℔ advance.
Metal, in width 2 in to 1 in., thinner than No. 28, 2c. ₩ ℔ advance.
Metal, in width 1 in. to ½ thinner than No. 28, 3c ₩ ℔ advance.
Metal, in width ½ in. to ¼, inclusive, not thinner than No. 28, 2c. ₩ ℔ advance.
Metal, in width ½ in. to ¼ thinner than No. 28, 5c. ₩ ℔ advance.
Metal, ¼ in. in width and less, 10c. ₩ ℔ advance.
Any of the above widths cut to particular lengths, add 7c. ₩ ℔.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire.
4 per cent., 12 inch, to No. 26	$0.55	$0.75
6 " " "	.61	.83
10 " " "	.73	.99
15 " " "	.88	1.19
18 " " "	.97	1.31

German Silver Sheets over 12 in. wide and weighing more than 16 ℔s., $2.25 ₩ ℔.
Advance 2c. for each additional inch in width above 12 in., and 2c. ₩ ℔ on each No. thinner than Nos. 26 to 36, inclusive
All German Silver thinner than No. 36 is Platers, at 50c ₩ ℔ additional.
German Silver Scrap one-third less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Copper.
No. 0 to 20	$0.30	$0.34	$0.40
No. 21	.33	.37	.43
No. 22	.34	.38	.44
No. 23	.35	.39	.45
No. 24	.37	.41	.47
No. 25	.40	.44	.50
No. 26	.42	.46	.52

No. 27	.45	.49	.55
No. 28	.49	.53	.00
No. 29	.52	.56	.64
No. 30	.55	.59	.69
No. 31	.59	.63	.75
No. 32	.63	.67	.81
No. 33	.67	71	.90
No. 34	.71	.75	1.00

Spring Wire 2c ₩ ℔ advance.
Flat, Square and Half Round Wire 5c ₩ ℔ advance on Round Wire.
Fancy Wire not less than 10c ₩ ℔ advance of Round Wire.
Brass Rods, No. 8 and smaller not less than 2 feet lengths, 45c.
Wire straightened and cut, smaller than No. 8, and not less than 2 feet lengths, 40c.
Wire and Rods less than 2 feet lengths, special rates.
Twelve cents per ℔ extra for spooling on 1 ℔ spools.

MISCELLANEOUS.
Common Plain Brass Pail Ears......$0.40
Brass Door Rail......40

SCRAP.
High Brass Scrap......13c
Low "......15c
Gilding......17c
Turnings, Filings and Chips half the price of Scrap.
Terms—Net cash. Interest to be added after thirty days.

TUBING.—dis 10 %
Plain to No. 20 inclusive, above ¼ in. to 3 in......$0.40
" above 3 in......50
Nos. 21, 22, 23, two cents advance on List for each Number.
Nos. 24, 25, 26, four cents advance on List for each Number.
Above No. 26, special rates.
Plain, ¼ inch......70
" 3-16 "......1.10
" ⅛ "......1.60
All Mandrel Drawn Tubes, 5 cents advance on List Prices.
Fancy Tubing to No. 20......48c
English, Scotch and Extra Patterns Fancy Tubing to No. 20......53
Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List.
Add to 2 cents ½ cent for each additional cutting under 2 feet.
All Mandrel Drawn Tubes under ⅜ in., 25 cents per pound advance.

ZINC TUBING.—net.
Plain......22
Fancy......28
Scotch and Extra Patterns......31

GERMAN SILVER TUBING.—dis 10 %
4 Per cent......85
6 "......95
9 "......1.10
12 "......1.25
15 "......1.40
16 "......1.45
18 "......1.55
20 "......1.56

STEEL.—Duty: Bars, Ingots, Sheets and Coils, valued at 7 cents ₩ ℔., or under, 2¼ cents; over, 7 cents, and not above 11, 3 cents ₩ ℔; over 11, 3½ cents ₩ ℔, and 10 % ad val. Railway Bars, 1¼ cents ₩ ℔. Railway Bars, in part Steel, 1 cent ₩ ℔. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.
Tool......15c
Spring......7c
Homogeneous......12½c
Boiler Plate......8c
Tire......5½c
Machinery (round and square)......9c
File......9c
Sheet......11 @ 16c
Saw Plate, mill and mulay......14 @ 16½c
" gang and X cut......13 @ 14c
" circular as to size......18 @ 30c

Chrome Steel.
Tool......₩ ℔ 14 @ 15c
Tool, extra fine......₩ ℔ 40 @ 75c
Spring......₩ ℔ 8 @ 9c
Machinery......₩ ℔ 8 @ 10c
Gun or Homogeneous......₩ ℔ 12 @ 16c

English Steel.—Payable in gold, net.
" Best Cast......₩ ℔ 15½c
" Extra Cast......₩ ℔ 16½c
" Round Machinery, Cast......₩ ℔ 10c
" Swaged, Cast......₩ ℔ 18c
" Best Double Shear......₩ ℔ 15⅛c
" Blister, 1st quality......₩ ℔ 13c
German Steel, Best......₩ ℔ 11c
" 2d quality......₩ ℔ 10c
" 3d quality......₩ ℔ 9c
Sheet Cast Steel, 1st quality......₩ ℔ 15½c
" " 2d quality......₩ ℔ 14½c
" " 3d quality......₩ ℔ 12½c

ANTIMONY......13 to 13½c

LEAD.—Duty: Pig $2 ₩ 100 ℔s; old Lead, 1½c ₩ ℔ Pipe and Sheet, 2⅜c ₩ ℔.
American......3¾ @ 4 c
Bar......5½c. dis 10 %
Pipe......6c. dis 10 %
Tin Lined Pipe......15c, dis 10 %
Sheet......6½c, dis 10 %
Shot......Drop 7½ Buck, 8½c, dis 10 %

BABBITT METAL.
N. P. U......₩ ℔ 6 @ 70
A 20c; B, 16c; C, 12c; D, 10c ₩ ℔.

TIN.—Duty: Plates, Sheets, Tagger and Terne, 1.1c ₩ ℔; Elecro-galvanized Plates, 2c ₩ ℔; Manufactures of, not enumerated, 35 per cent. ad. val. Bars, Block and Pigs free. Banca, subject to duty of 10 per cent.
Banca......₩ ℔ 19 currency
Straits......₩ ℔ 16 @ 17 currency
English......₩ ℔ 16 @ 17 currency

TIN PLATES, CURRENCY PRICES
I C 10x14, 12x12, 14x20 } Prime Charcoal......$6.25 @ 6.37½
I X 10x14, 12x12, 14x20 } Prime Charcoal......8.25 @ 8.50
D C 12½x17 "......5.75 @ 6.00
D X 12½x17 "......7.75 @ 8.00
For each additional X add......

COKE TIN PLATE.

	Best.	2d quality.	Ordinary.
I C 10x14, I C 12x12, I C 14x20	$6.00	5.75	5.00 @ 5.50

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$5.87 @	5.63½ @ 5.75	5.25 @ 5.50
I X 14x20	.... @ 8.00	....	....
I C 20x28	12.00 @ 12.25	11.50 @ 11.75	10.75 @ 11.00
I X 20x28	.... @ 10.00	....	....
I C 20x200	.... @ 19.00	....	....
I C 14x20 M. F. Brand		$7.25	....

SOLDER......No. 1, 9 @ 10½c; No. 2, 8½ @ 9c

SPELTER—Duty: In Pigs, Bars and Plates, $1 ₩ 100 ℔s.
American, cash......5¼ @ 5½c
Lehigh, on spot......10c

ZINC.—Duty: Pig or Block, $1.50 ₩ 100 ℔s. Sheet, 2½c ₩ ℔.
Sheet, Cask......6½c
" Open......6¾ @ 7c

Paper Stock, Old Metals, &c

(Dealer's Selling Price.)
Canvas linen......4 @ 4½
" cotton, No. 1......5½ @
" " No. 2......@ 3½
White linen rags, No. 1......5¼ @ 5
" " No. 2......3¼ @
Seconds......2¼ @
Mixed woolens......2½ @ 3¼
Soft woolens......7 @ 7½
Gunny bagging......3⅜ @
Jute Butts......3 @ 3½
Kentucky bagging......5 @
Waste paper and scraps......1 @ 1½
Rope cuttings......1½ @ 3
Kentucky bale rope......4 @ 4½
Oakum junk, No. 1......5½ @ 5¾
" No. 2......@ 4
Grass rope......3 @
Tarred shaking......2 @
White collar cuttings, all paper......7 @
" " " muslin lined......5 @
" " Envelope......7 @
Hard White Shavings, No. 1......4 @
Soft " " No. 1......3½ @
White Shavings, No. 2......3¼ @
Mixed Shavings, part white......2¼ @
Imperfections, No. 2, best folded sheets......4½ @
" No. 1, Heavy Stock......4½ @
Book Stock......@ 3¼
" " Heavy......3 @
" " Light......1½ @
Newspaper Stock......1¾ @ 2
Prints......1½ @ 2
Pure Manilas......2¾ @ 2⅞
Bogus Manilas and Hardwares......1 @
Commons......½ @
Binders' Board Cuttings......1 @ 1¼
Straw Board Cuttings......¾ @
Woolen Tailor Clips......13 @ 14
Satinet "......2 @ 2½

Old Metal.
Copper, heavy......14½ @
Copper Bottoms......12½
Yellow Metal......13 @
Brass, light......8½ @
" heavy......10½ @
Heavy Composition......13 @
Old Lead, solid......@ 3¼
Tea Lead......@ 2¾
Zinc......@ 3⅛
Pewter, No 1......10 @
" No. 2......8 @
Wrought Iron......per ton $17.00
Machinery Iron......per ton 11.00
Light Iron......per ton 10.00
Stove Plate......per ton 10.00
Grate Bars......per ton 4.00

Paints, Oils, &c.

Paints.
Black Lamp, Coach Painters......₩ ℔ 20c
" " Ordinary......6c
" Ivory Drop, fair......12 @ 15c
" " best......23c
Black Paint, in oil......kegs, 8c asst'd cans, 11c
Blue, Prussian, fair to best......40 @ 55c
" " " " in oil......35 @ 55c
Blue Chinese dry......85c
" Ultramarine......18 @ 30c
Brown, Spanish......1¼c
" Van Dyke......10@12c
Carmine, 40......combination price
Green, Chrome......15 @ 23c
" " in oil......14 @ 18 @ 25c
" Paris......good 25c; best, 30c
" " in oil...... " 30c; " 45c
Iron Paint, Bright Red......₩ ℔ 2½c
" Red......₩ ℔ 2c
" Brown......₩ ℔ 1½c
" Purple......₩ ℔ 3c
" Ground in Oil, Bright Red......₩ ℔ 5½c
" " " Red......₩ ℔ 5c
" " " Brown......₩ ℔ 4½c
" " " Purple......₩ ℔ 6c
Mineral Paints......1¼ @ 4c
Orange Mineral......12c
Red Lead, American......7½c
" " English......9½c gold
" Venetian (N. C.) dry......$1.70 @ $1.75
" " in oil...... asst'd cans, 11c; kegs, 8c
" Indian dry......9 @ 12c
Rose Pink......10 @ 13c
Sienna, American, Raw......4c
" Burnt......4½c
" " in oil......10 @ 16 @ 20c
" Raw " ......11 @ 15 @ 25c
Umber, Burnt......4 @ 8c
" " in oil......9 @ 12 @ 16c
" Raw......3½ @ 7½c
" " in oil......10 @ 16 @ 18c
Vermillion, Chinese......90c, gold
" English......60c, gold
" Trieste......1.10, gold
" American, Common......18c
White Lead, American, pure dry......8c
" " " in oil......8½c
White, Paris, English, prime......in bbls. 2 @ 2½c
Yellow Ochre, French......$1.75
" " " in oil...asst'd cans, 11c; kegs, 8c
" " Vermont......in casks 1½c
Yellow Chrome......17 @ 27c
" " in oil......14 @ 18 @ 25c
Zinc White, American No. 1, dry......8½c
" " No. 1, in oil......11c
" French (Paris)......11c
" " in oil......10½ @ 11½c

Oils.
Linseed, Raw, in casks and bbls......₩ gal. 58c @ 60c
" Boiled. " "...... " 63c @ 65c
Whale, Crude......bbl. 53c @ 55c
" Bleached Winter......bbl, 65c @ 70c
" Unbleached......bbl, 62c @ 63c
Cotton Seed, Crude......bbl, 50c
" Southern Yellow......bbl, 55c
" White......bbl, 60c
Neatsfoot, Winter......70c @ $1.10
Natural Lubricating......36c @ 38c

Sundries.
Asphantum......9c
Benzine......₩ gal. 16c
Chalk......¾c
" Block......¾c
Dryer, Patent, Am'n......ass't cans, 10½c; keg, 9c
Frostings......00
Glue, White......33 @ 44c
" Sheet......00
Glaziers' Points, Zinc......50
Gum, Copal......36c
" Damar......25c
" Shellac, English......30c
" " dark......25c
Litharge, English......9c gold
Pumice Stone, selected Lumps......4 @ 6c
" powdered......2½c
Putty, in bladders......2½c
" in bulk......2c
Rotten Stone, soft, English......8c
Spirits Turpentine......30c
Whiting Spanish......¾c

Glass.
FRENCH WINDOW GLASS.
Prices current per box of 50 feet.

Single Thick.—discount 60 %

SIZES.	1st.	2d.	3d.	4th
6 x 8 to 10 x 15	$7.50	$6.75	$6.25	$5.75
11 x 14 to 16 x 24	8.50	7.75	7.25	6.50
13 x 22 to 20 x 30	10.75	9.75	8.75	[illegible]
15 x 36 to 24 x 30	12.25	10.75	9.00	
26 x 28 to 24 x 36	13.00	11.50	9.75	
26 x 37 to 26 x 44	14.50	13.25	10.75	
26 x 46 to 30 x 50	15.00	14.00	11.25	
30 x 52 to 30 x 54	16.00	14.50	12.00	
30 x 56 to 34 x 56	17.25	15.50	13.50	
34 x 58 to 34 x 60	18.25	17.25	15.00	
36 x 60 to 40 x 60	20.75	18.75	17.25	

Double Thick.—Discount 60&10 %

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$12.00	$11.00	$10.00	$9.[illegible]
11 x 14 to 16 x 24	13.75	12.50	11.75	10.[illegible]
18 x 22 to 20 x 30	17.25	15.75	14.00	
15 x 36 to 24 x 30	19.75	17.25	14.50	
26 x 28 to 24 x 36	21.00	18.50	15.75	
26 x 36 to 26 x 44	23.25	21.25	17.25	
26 x 46 to 30 x 50	24.00	22.50	18.00	
30 x 52 to 30 x 54	25.75	23.25	19.25	
30 x 56 to 34 x 56	27.75	25.00	21.75	
34 x 58 to 34 x 60	29.25	27.75	24.00	
36 x 60 to 40 x 60	33.25	30.00	27.75	

Sizes above 40 x 60—$10.00 per box extra for every five inches.
An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the 81 united inches brac

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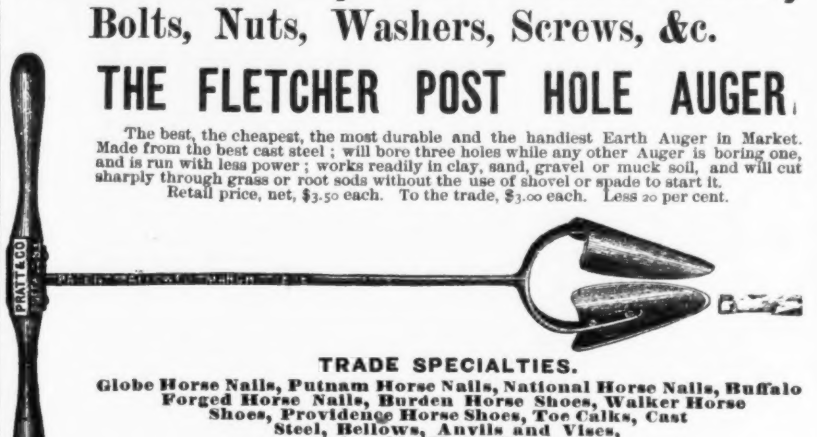

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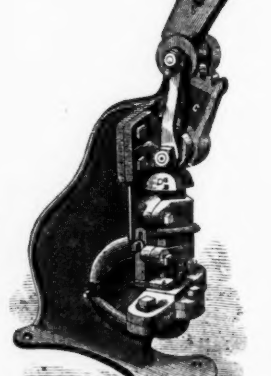

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Shears for Plates & Bars.

Lyon's Patent Hand and Power

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IMPROVED ICE CREAM FREEZER.

FOUR STYLES—15 SIZES.

GEARED FREEZERS.

No. 20	3 quart.	No. 24	10 quart.
No. 21	4 "	No. 25	12 "
No. 22	6 "	No. 26	16 "
No. 23	8 "	No. 27	20 "

FLY WHEEL FREEZERS.

No. 28	16 quart.	No. 30	32 quar
No. 29	20 "	No. 31	40 "

FRAME FREEZERS.
No. 33......32 quart.
No. 34......40 "

DUPLEX FREEZERS.
No. 32......Two 20 quart.

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A WEEKLY TRADE JOURNAL.

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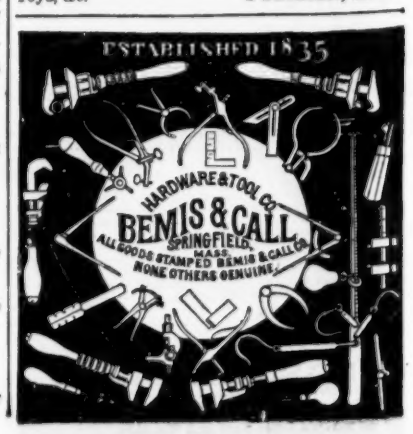

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Cleveland Cast Steel Works.
H. W. FOOTE, Proprietor.

SPECIALTIES.—Forged and Cast Cast Steel Plow Points, Shovel Plow Blades, Harrow and Cultivator Teeth, and Crow Bars of any pattern to order.

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BUTCHERS' STEELS,
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LIGHT DRAFT AND EASILY ADJUSTED.

This machine presents all the advantages of a light and durable LAWN MOWER, and we believe has good qualities which cannot fail to be appreciated. It is the lightest machine in use, and all that is necessary to satisfy our customers of its superiority is to place it in competion with *any other machine* in the town in which they may reside.

☞ Every machine warranted to work as represented.

PRICE LIST.

Width of Cutter.	Description.	Price.
12 inch.	8 in. driving wheel, wt. 33½ lbs. Can be used by a lad.. each,	$18.00
14 "	8 in driving wheel, wt. 34¾ lbs. Can be used by a lady.. "	20.00
16 "	8 in. driving wheel, wt. 36¾ lbs. One man size..... "	22.00

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LOOK WELL TO YOUR HORSE'S FEET.

This drawing shows how many horses are made lame and permanently injured by the use of the *cold-cut* and *sheared pointed* nails. This process of manufacture produces lamination, causing the iron to form in layers, and when driven into the foot the horny fibres of which the hoof is composed cause the nail to separate at the point and one portion passes *into* the foot.

No. 4 represents one of these nails which was driven into the hoof, and *slivered* in driving, one *thin* blade passing into the quick or sensitive sole. No. 5 the *thick* blade of the nail passed out of the wall of the hoof for clinching. After a few days the horse was returned lame, and upon the removal of the shoe, a nail similar to the above was broken off, leaving the sliver in the foot; *lockjaw* ensued, from which the horse died. Upon dissecting the foot a portion of the nail was found to have penetrated through the Coffin bone, as seen in Fig. 2, letter A thus sacrificing the life of a valuable animal.

It requires but little observation and reflection, one would think, to arrive at the conclusion as to the kind of nails to be used in the horse's foot; whether a mangled piece of iron, rendered DANGEROUS by the *Cold-Rolling and Shearing* process, or one made from the rod at a welding heat, where all the fibres remain intact, and a perfect *oneness* maintained, and which being pointed by the hammer, *every* nail is inspected, rendering such an accident as slivering utterly impossible.

The foot is the *most important* member of the animal's body, to which the greatest care and attention should be directed; for when it becomes injured or deceased, no matter how perfect or sound the other parts may be, the horse's services are diminished or altogether lost. Hence the value of a horse depends upon the condition of his feet. "NO FOOT NO HORSE."

As the remedy lies with the owner of the horse, it is for him to prohibit any cold-rolled or sheared nails being used in his horse's feet. **The only Hot-Drawn and Hammer-Pointed Horse Shoe Nail in the World that is *not cut or clipped, sheared*** upon the point, and will not split in driving, is the PUTNAM NAIL. See that your horse is shod with this nail and avoid all risks. For sale by all dealers in Horse nails.

The above drawing was made from a nail, showing the lamination of iron in the *Cold-Rolled and Shearing* process.

This drawing was made from the nail taken from the hoof and coffin bone, as shown in Figs. 1 and 2.

We have known several cases in which valuable horses have been badly lamed by the use of *Cold-Rolled and Sheared* horse shoe nails. We have used the same nails and been compelled to banish them from our shop. The Hot Forging process is the only sure manner of making a true driving and safe nail.

REV. W. H. H. MURRAY, *Golden Rule*, October 31, 1877.

OFFICE OF THE LEDGER, NEW YORK, November 22, 1877.

Messrs. Putnam & Co.: GENTS.—I have been using your nails now for four or five weeks on all the shoes that we put on my horses, and I have no hesitation in saying that we have never used any nails that gave us so little trouble. I prefer them to any hand-made nail that I have ever seen. Yours truly,

ROBERT BONNER.

SAN FRANCISCO, January 4, 1878.

The Putnam Nail Co., Boston: GENTLEMEN.—After long usage can safely recommend to all owners of track and light-harness horses your *Hot Forged Horse Shoe Nails.* Yours respectfully, BUDD DOBLE.

Samples sent free by mail by addressing

PUTNAM NAIL CO.,
P. O. Address, Neponset, Mass. Boston Mass.

THE HP HORSE NAIL CO.,
Cleveland, Ohio.

These Nails are manufactured from the **Best Selected Stock.** Send for circulars showing discounts.

These Nails ARE **Guaranteed to be Equal** to the best in the market, and are sold at greatly reduced rates.

5d	6d	7d	8d	9d	10d
26c.	23c.	21c.	20c.	19c.	18c.

NORTHWESTERN
HORSE NAIL CO.
ESTABLISHED IN 1862,

Hammered & Finished Horse Nails.

We offer our Finished Nail to the trade with the confidence that it has no equal in the market. It is the genuine "Northwestern" Nail, Finished, and we give it our unqualified guaranty.

Office and Factory, 56 to 68 Van Buren St., Chicago.

A. W. KINGSLAND, Secretary.

Our agents, Graham & Haines, 113 Chambers Street, New York, carry a full line of our goods, and will be pleased to serve you at Factory prices.

GLOBE NAIL COMPANY,
MANUFACTURERS OF

Pointed Polished & Finished Horse Shoe Nails.

Recommended by over 20,000 Horse Shoers.

All nails made from best NORWAY IRON, and warranted perfect and ready for driving. Orders filled promptly and at lowest rates by

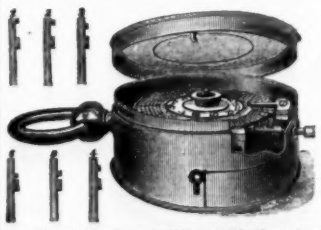
GLOBE NAIL CO., Boston, Mass.

RHODE ISLAND HORSE SHOE CO.,
OFFICE, 81 Canal Street, Providence, R. I. WORKS at Valley Falls, R. I.

Manufacturers of

PERKINS and RHODE ISLAND PATTERNS of

HORSE AND MULE SHOES.



BUERK'S
Watchman's Time DETECTOR.

IMPORTANT FOR ALL LARGE CORPORATIONS AND MANUFACTURING CONCERNS.

Capable of controlling with the utmost accuracy the motion of a watchman or patrolman as the same reaches different stations of his beat. The instrument is complete in itself, portable and as reliable as the best lever watch. It requires no fixture or wires communicating from room to room, as is the case with the ordinary watch clocks. A small, inexpensive stationary key is alone required at each station. The instrument will, in all cases, be warranted perfect and satisfactory.

N. B.—The suit against Imhaeuser & Co., of New York, was decided in my favor, June 10, 1874. Another suit has been decided against them and a fine assessed Nov. 11, 1876, for selling contrary to the order of the Court. Persons using clocks infringing on my Patent will be dealt with according to law.

J. E. BUERK, Proprietor,

P. O. Box 979. *No. 230 Washington Street, Boston.*

☞ In sending for circular or ordering the above, please mention this paper.

Emery, Grindstones, &c.

Walter R. Wood,
GRINDSTONES.
Berea, O., Nova Scotia, & other brands.

283 and 285 Front Street, New York.

WORTHINGTON & SONS,
North Amherst, Ohio.

Manufacturers of

Lake Huron Amherst and Berea
GRINDSTONES.

H. S. WOOD & CO.,

Manufacturers of	Importers of
Berea, O.	**New Castle, Eng.**
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GRINDSTONES,
33 West and 58 Washington Sts., N. Y.

COOPER & HOILE,
PATENTED

Composite Grindstones,
WHETSTONES, &c., &c.

SOLE MANUFACTURERS.

C&H

OFFICE:

351 Adams St., BROOKLYN, N. Y.

All grades for **fine** and **coarse** work. **Superior** to any foreign or domestic Stone and **cheaper.** Send for Price List and testimonials.

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Wilson & Hughes Stone Co.,
Quarrymen.

AMHERST BUILDING STONE,
Buff and Light Drab Colors. Independence and Amherst Grindstones, for every variety of grinding. Ohio Fire-proof and Mineral Paints. Fire-proof Stove Putty. Orders promptly filled. **CLEVELAND, O.**

Steam Oil Stone Works.
F. E. DISHMAN,
Successor to WM. GALBRAITH & Co.

Manufacturer of and Dealer in the Best

Washita, Arkansas, Hindostan and Sand
STONES,
☞ Of various sizes and patterns, suited to every variety of Mechanical use. ☜ **New Albany, Ind.**

Send for price list.

BOYD & CHASE
The largest manufacturers in the world of

OIL STONE

Of all description.

107th Street and Harlem River,

Send for Illustrated Price List. **NEW YORK**

"Bridgewater Iron Co.'s Horse Nails."
LIST PRICE, Pointed and Polished.

No. 5	6	7	8	9	10
26c.	23c.	21c.	20c.	19c.	18c. per lb.

Full Assortment of above always on hand

AND FOR SALE BY

THE PARKER MILLS,
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Coal.

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The following superior and well known Lehigh Coals are mined by ourselves and firms connected with us, viz.

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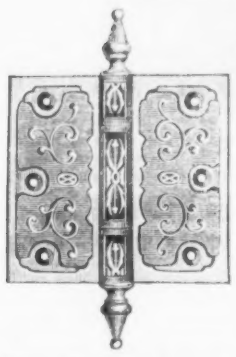

BUILDERS' HARDWARE.

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TENNIS & WILSON, Agents,

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Send for Catalogue and Price List.

The American Machine Co.,

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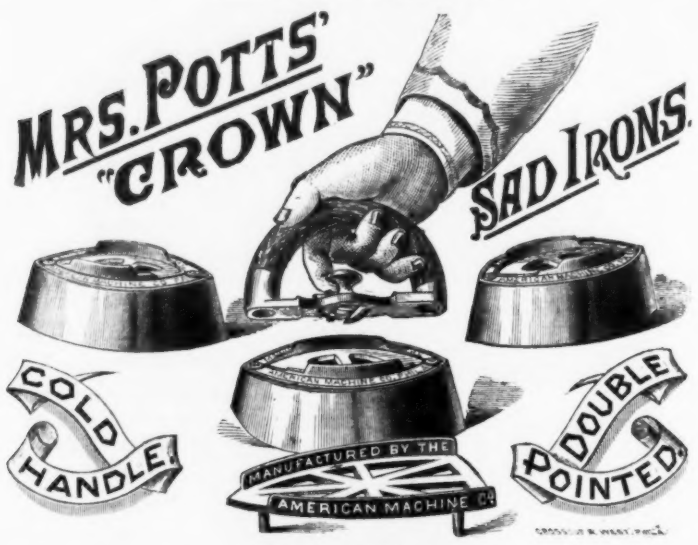

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Office and Factory,

1916 to 1924 North Fourth Street, - - - PHILADELPHIA, PA.

"FELTER'S PATENT LOCKS,"

MANUFACTURED BY

The American Lock Mfg. Co.,

Are the most **SECURE** and **DURABLE** ever made.

SECURE

Because they have 40 Brass Tumblers, independent in their action, either one of which will prevent the cock from being opened unless brought to proper position by the Key.

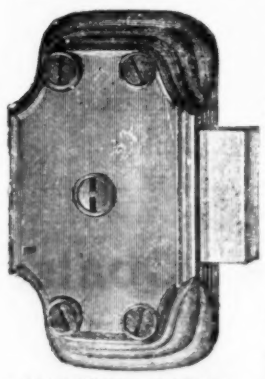
DURABLE

Because we use no Springs to break or get out of place.

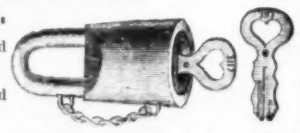
THEY HAVE

STERLING METAL KEYS

That will not corrode or wear, and are stronger than steel.



Upright Rim Dead Locks,
Horizontal Rim Night Latches,
Horizontal Rim Tubular Night Latches,
Mortise Night Latches, Plain Fronts,
Mortise Night Latches, Ornamental Bronze Fronts and Knobs,
Brass Chest, Box, Cupboard and Drawer Locks,
Solid Bronze Padlocks.



Illustrated Catalogue and Price List sent on application.

All orders should be addressed to

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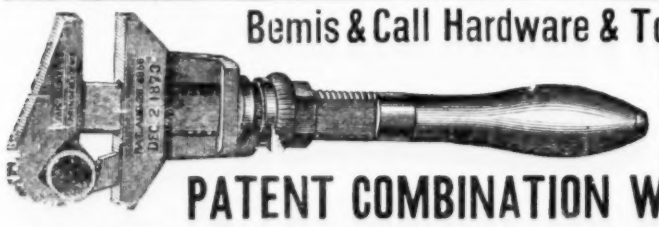
Bemis & Call Hardware & Tool Co.



This Wrench can be furnished with Brigg's Pat. Nut or Sleeve.

PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, Case-Hardened throughout, and not only combine all of the superior qualities of our cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a Combination which has no equal. For Circulars and Price List, address,

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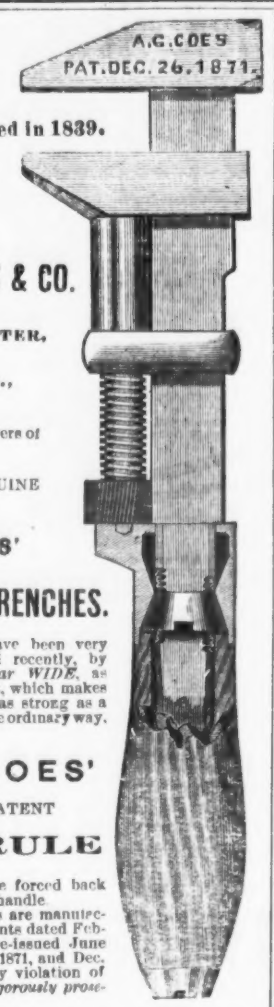

Established in 1839.

A. G. COES & CO.

WORCESTER, Mass.,

Manufacturers of

THE GENUINE

COES'

SCREW WRENCHES.

Our goods have been very much improved recently, by making the *Bar WIDE*, as shown in the cut, which makes a 12 in. Wrench as strong as a 15 in. made in the ordinary way, and by using

A. G. COES'

NEW PATENT

FERRULE

Which cannot be forced back into the handle.

☞ Our goods are manufactured under Patents dated February 7, 1860, (re-issued June 29, 1871), May 2, 1871, and Dec. 26, 1871, and any violation of either will be *vigorously prosecuted*.

We call particular attention to our new Patent Ferrule, with its supporting Nut (shown in section in the above cut), which makes the strongest Ferrule fastening known.

A. G. COES & CO.

Our Agents, GRAHAM & HAINES, 113 Chambers St. New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

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Manufacturers of

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MALLETS,

Hawsing Beetles, Hawsing and Calking Irons also all kinds of Handles, Sledge, Chisel and Hammer Handles. Also

COTTON AND BALE HOOKS,

Patented Feb. 13, 1877; a new combination of Hooks.

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MANUFACTURERS OF

Brass, Galvanized and Ship Chandlery

HARDWARE.

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BRASS Pad Locks,

FOR

Railroad Switches, Freight Cars, and the Hardware Trade.

All sizes, with Brass and Steel Keys, with & without chains.

Passenger Car Locks,

Bronzed, Nickel-Plated and Japanned.

Patent Tubular Night Latches.

Will answer for Doors from 1¼ to 2 inches.

BROOKLYN, N. Y.

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Established 1857. Manufacturers of Patent Scandinavian or Jail Locks. Brass Pad Locks for Railroads and Switches. Also, Patent Stationary R. R. Car Door Locks. Patent Piano and Sewing Machine Locks.

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COBB & DREW,

Plymouth, Mass.

Manufacturers of Copper, Brass, and Iron Rivets: Common and Swedes Iron, Leathered, Carpet, Lace and Gimp Tacks; Finishing, Hungarian, Trunk Clout and Cigar Box Nails, &c. Rivets made to Order.

NEW YORK AGENCY

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HARDWARE.

165 Greenwich Street.

Agents for the Philadelphia Star Carriage and Tire Bolts.

SAM'L G. B. COOK & CO.,

American and Foreign

Hardware and Cutlery Manufacturers' Agents,

Nos. 5 & 7 German St., - - BALTIMORE.

Represent and carry in stock a full line of the following manufacturers' goods, which we offer **the Trade** at manufacturers' prices and terms:

American Screw Co., Screws.
American Tea Tray Co.
American Machine Co., Crown Fluters, Wringers, etc.
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Beardsley Scythe Co.
Bailey Tool Co., Defiance Iron Planes.
T. H. Bullock, Bellows.
Carr, Crawley & Devlin, Building, Cabinet and Saddlery Hardware.
Clark & Co., Patent Blind and Gate Hinges.
Cowles Hardware Co., House Furnishing and other Hardware.
Clark Bros. & Co., Carriage, Tire and other Bolts.
Connecticut Cutlery Co., Pocket Cutlery and Trimmers.
H. Chapin's Son, Rules, Levels, etc.
John Chatillon & Sons, Balances.
L. Coes & Co., Patent Screw Wrenches.
A. Field & Sons, Tacks, Nails, etc.
Forsythe Scale Works, Scales and Wrought Goods.
Hubbard, Bakewell & Co., Lippencott Axes and Shovels.
Iowa Farming Tool Co., Handled Hoes and Rakes, Snaths, etc.
Kimball Shovel Co., Solid Cast Steel Shovels and Spades.
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Henry W. Kip, C. S. Hammers.
Lancaster Bolt Co., Eagle Carriage and Tire Bolts.
Lamson & Goodnow Mfg. Co., Table Cutlery, Butcher Knives, etc.
Meriden Britannia Co., Plated Ware and Britannia Spoons.
W. T. & J. Mersereau, Stair Rods, etc.
Wm. McNeice, Saws.
Nicholson File Co.,
Saranac and International Horse Nails.
Northwestern Horse Nail Co.
Peck Bros. & Co., Brass Cocks.
A. G. Patton, Enameled and Tinned Hollow Ware.
Rogers Bros., "A1 1847" Plated Spoons, Forks, etc.
Roy & Co., Strap and T and Hook and Eye Hinges, Wrought Butts, Nuts, Washers, etc.
James R. Torrey's Razors and Straps.
U. S. Lock Co., Shepherdston's Patent Locks.
O. B. Wilson, Cow Bells.

And other manufacturers, making our assortment of

Builders', Cabinet, Agricultural and House Furnishing Hardware & Cutlery.

As complete as can be found in any house. Also full stock of

Wostenholm's, Rodgers', Field & Co., Continental and German Cutlery, W. & S. Butcher's Razors, Edge Tools and Files.

Full line of

REVOLVERS AND CARTRIDGES.

And a general assortment of

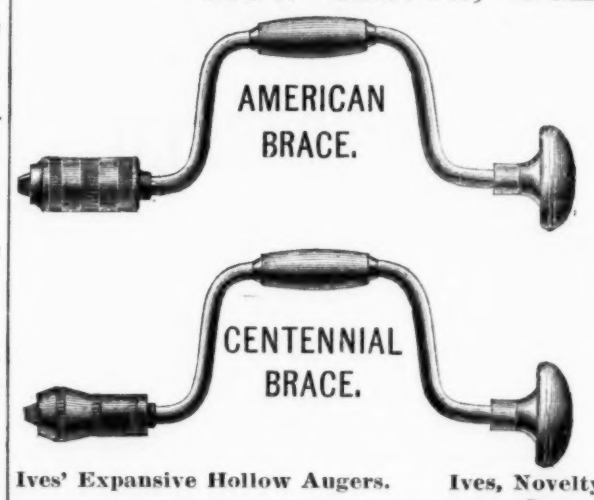
SHELF AND HEAVY HARDWARE.

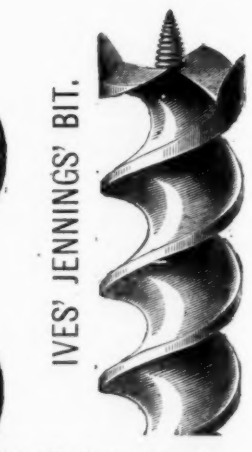
Orders filled promptly from stock.

☞ Consignments of desirable goods solicited.

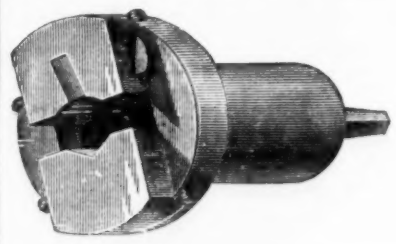
WILLIAM A. IVES & CO.,

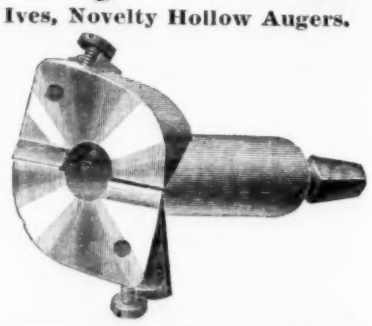
New Haven, Conn.

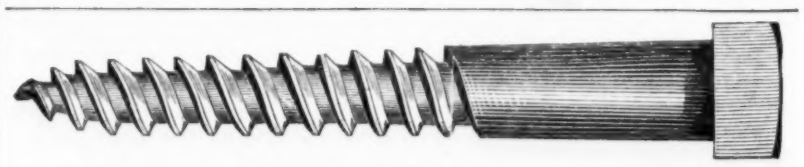




Ives' Expansive Hollow Augers. **Ives, Novelty Hollow Augers.**







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Pawtucket, R. I.,

MANUFACTURERS OF

COACH SCREWS

(With Gimlet Points),

ALL KINDS OF

Machine and Plow Bolts,

FORGED SET SCREWS,

AND

TAP BOLTS.

HENRY B. NEWHALL 11 WARREN ST. N NEW YORK AGENT

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(Corrected weekly by Lloyd, Supplee & Walton).

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.
Peter Wright's, ℔ ℔, gold.....10½c
over 250 lbs.....11c. gold, net
Wilkinson's, ℔ ℔, gold.....11c. net
Eagle (American).....9 cents per lb—dis 20%

Apple Parers.—
Reading No. 72.....per doz $ 5 50 net
" " 75..... " 6 25 net
" " 76..... " 7 00 net
" " 77..... " 7 50 net
Peach Parers..... " 10 00 net
Little Favorite, corer and slicer..... " 7 50 net
Lots of 10 to 25 dozen special price.

Axes.—
Mann's Red Warrior .....Per doz. $8 50 @ 9 00 net
Red Indian..... " 8 50 @ 9 00 net
Red Chieftain, bevelled..... " 9 00 @ 10 00 net
Crown Prince..... " 9 50 @ 10 50 net

Augers and Auger Bits.—
Bates' Nut Augers.....dis 40&10 @ 50 %
Cook's Augers.....dis 50 @ 50&5 %
Watrous' Ship Augers.....dis 15 %
Benjamin Pierce Auger Bitts.....dis 40 %
Griswold Auger Bits.....dis 40&10 @ 50 %
Cook's " ".....dis 50 @ 50&5 %
Jennings' " ".....dis 10&10 %
Bonney's Pat. Hol. Augers, list $18 ℔ doz...dis 25&10 %
Stearns' Pat. Hol. Augers " $18 " ...dis 25&10 %

Balances.—
Light and "Common".....dis 25&10 %
All other Spring Balances.....dis 25 %

Bells.—
Bevin Bros. Mfg Co. Light Hand Bells.....dis 70 @ 75 %
Swiss Pattern Hand Bells.....dis 50 @ 50&10 %
Connell's Door Bells.....dis 50 @ 50&10 %
Gt. Western & Kentucky Cow, new list.....dis 50 %

Boring Machines.—
Upright, with Augers.....List $9 00 dis 40&10 %
" without Augers..... " 5 50 dis 40&10 %
Angular, with Augers..... " 11 00 dis 40&10 %
" without Augers..... " 7 00 dis 40&10 %

Bolts.—Eastern Carriage Bolts.....dis 75&3⅓ %—cash
Philadelphia " ".....dis 60&10 @ 60&20 %
Stanley, Wrought Shutter.....dis 50 %

Braces.—Barber's.....dis 40&5 %
Backus.....dis 50 @ 50&10 %
Spofford.....dis 50 %
American Ball.....dis 25&10 %

Butts.—Cast Fast Joint, Narrow.....dis 60&10 %
" " Broad.....dis 65&10 %
Cast Loose Joint, Narrow.....dis 70&10 %
" " " Broad.....70&10 %
" Acorn, Loose Pin.....dis 65&10 %
" Acorn " Jap'd.....dis 67½&10 %
Mayer's Loose Joint.....dis 70&10 %
Wrought Loose Pin.....dis 40&10 %
" Table Hinges and Back Flaps.....dis 35&10 %
" Narrow, Fast.....dis 40&10 %
" Loose Joint.....dis 40&10 %

Blind Butts.
Parker.....dis 60 @ 60&10 %
Clark.....dis 60 %
Shepard.....dis 60 %
Lull & Porter.....dis 66⅔&10 %
Huffer's.....dis 33⅓ @ 33⅓&10 %

Chains.—German Halter and Coil.....dis 30&5 % gold
Galvanized Pump.....℔ ℔ 10½c net
Best Proof Coil Chain—(English).

℔ ℔.....	11½	8⅝	7¾	7⅛	8⅛	8¼	7c gold
	3-16	¼	5-16	⅜	7-16	½	⅝ in.

Chisels.—Socket Framing.....dis 65, 5&10 %
Socket Firmer.....dis 65, 5&10 %
Butcher's.....$5 00 to £ gold

Casters.—Bed.....dis 50&10 %
Plate.....dis 50&10 %

Coffee Mills.—Box and Side.....dis 25 %
Enterprise.....dis 20 %

Cutlery.—Walden Pocket.....dis 30 @ 35 %
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net

Drawing Knives.—
Hart Mfg. Co.'s.....dis 65, 5&10 %
Adjustable Handle.....dis 20 %

Fry Pans.
Tinned.....dis 50&10 @ 60 %

℔ doz..	$3 50	4 00	4 50	5 00	5 50	6 50	7 50	9 00	10 00
No.....	0	1	2	3	4	5	6	7	8

Burnished.....dis 50&10 @ 60 %

℔ doz..	$3 00	3 75	4 25	4 75	5 25	6 00	7 00	8 00	9 00
No.....	0	1	2	3	4	5	6	7	8

Files.
Nicholson.....dis 35 %
Disston.....dis 35 %
Butcher.....$4 50 £ gold
Spencer.....$4 50 @ 4 75 £ gold

Fluting Machines.
Imperial—4½ in. roll.....each $2 50 net
" —6 in. roll..... " 3 00 net
Eagle—3½ in. roll.....per doz., $39 00
" —5½ in. roll..... 40 00
Crown—1½ in. roll.....Each 4 00 } dis 45 %
" —6 in. roll..... " 4 75
" —8 in. roll..... " 7 25
Geneva Fluter.....per doz. 15 00 net
Favorite com. Fluter & Sad-Iron..℔ doz $20 dis 25&10 %

Hammers.
Yerkes & Plumb's.....dis 25 @ 30 %
Hammond & Son's.....dis 25 @ 30 %

Hatchets.
Yerkes & Plumb.....dis 25 @ 30 %
Hammond.....dis 25 @ 30 %
Hunt.....dis 25 %

Hinges.
Strap and T.....dis 60 @ 60&5 %

Horse Nails.

	Nos. 5	6	7	8	9	10
Ausable.....	30	27	25	24	23	22
" Polished & Pt'd and Blued and Pointed	31	28	26	25	24	23
Globe.....Net list	26	23	21	20	19	18
Clinton.....	22	20	19	18	17	
" Polished and Pointed.....	23	21	20	19	18	

Southern, all sizes.....℔ ℔ 14c. net
Discount on Ausable and Clinton, 20 %; Globe, net.

Locks and Knobs.
Branford.....new list, dis 60&10&2 % cash
Gaylord Cabinet.....dis 25&2 % cash
United States Lock Co.....dis 35 %
American Padlocks.....dis 33⅓, 5&2 % cash
Scandinavian Pad Locks.

℔ doz...	$5 00	5 50	6 50	7 50	8 50	10 00	12 50 } dis 50 %
No......	57	58	59	60	61	62	63
℔ doz.....			$18 00		26 00		33 00 } dis 50 %
No.....			64		65		66

Lanterns.—
Square Candle and Oil.....℔ doz. $2 75 @ 3 00
Tubular.....No. 0, $10 50; No. 1, 12 50 ℔ doz. net
Guards, 50 cents extra per doz. net.

Mattocks.—
Long and Short Cutter.....℔ doz. $9 00 @ 9 50 net
Pennsylvania Pattern..... " 9 50 @ 10 00 net

Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 62½&10 %
Lincoln's ".....dis 62½&10 %
Landers, Frary & Clark's Petroleum.....dis 20&10 %
Brass Liquor Cocks.....dis 5 %
Cork Lined ".....dis 65 @ 65&10 %

Meat Cutters.—Dixon's.....dis 25 @ 30 %
Woodruff.....dis 25 @ 30 %
Stowe.....dis 25 @ 30 %
Hale's.....new list, dis 50&2 %
American.....dis 25 %
Stuffers.....dis 25 @ 30 %
Enterprise Stuffers.....dis 20 %

Planes.—Sandusky.....dis 35 %
Ogontz.....dis 50&10 %
Bailey.....dis 25&10 %

Plane Irons.—Sandusky.....dis 10&10 %
Butcher's.....gold £, $5 50

Plumbs and Levels.
Stanley's Adjustable.....dis 60&10 %
" Non-Adjustable.....dis 60&10 %

Picks.—Philadelphia.....dis 0 %
Hunt's.....dis 25 %

Pumps.—Bickford.....$7.00, dis 20&10 %

Rules—Stanley Boxwood.....dis 60&10 %
Stanley Ivory.....dis 50&10 %

Steelyards.—Hart's Pattern.....dis 60&10 %

℔ doz.....	$14 50	17 75	21 00	26 50	31 00	35 50
Lbs.....	50	100	150	200	250	300

American Pattern.....dis 25 @ 25&10 %

℔ doz.....	$5 50	7 00	9 00	10 00	11 00	12 00
Lbs.....	50	100	150	200	250	300

English Pattern.....dis 20 @ 25 %

℔ doz.....	$7 00	8 67	10 67	12 67	14 67	16 67
Lbs.....	50	100	150	200	250	300

Squares.—
Steel and Iron.....dis 50 %; full case, dis 50&10 %
Try Squares, Stanley.....dis 45&10 %
Disston's Try Squares.....dis 45 %

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened.....℔ doz. $9 00 net
Clipper No. 10, Bronzed Blade Boxed and Sharpened.....℔ doz. $8 50 net
Clipper No. 5, Painted Red, Boxed and Sharpened.....℔ doz $8 25 net

Saws—Disston's Hand, Panel and Rip.....dis 20 %
Disston's Circular.....dis 30 %
" Cross-Cut No. 2, Plain Tooth..℔ ft., 45c net
" " Patent Tooth.....℔ ft., 45c. net
" " Champion Tooth.....℔ ft., 35c. net

Shovels and Spades.
Rowland.....dis 50&5 %
Oliver Ames & Sons, new list.....dis 30 %

Sad Irons.—4 to 10 lbs.....℔ ℔.. 2¼ @ 2½c
Mrs. Potts' Patent.....dis 30 @ 40 %

Stone.—Arkansas Oil Stone.....℔ ℔ $2 00 net
Washita Extra..... " 35c net
" No. 1..... " 30c net
" " 2..... " 25c net
" Slips..... " 60c net
" Axe..... " 25c net
Turkey Oil Stone No. 1..... " 16½c net
" " " 2..... " 16c net
" Axe Stone..... " 25c net
Hindostan Oil Stone No. 1.....℔ ℔ 4 @ 4½c net
" Axe Stone..... " 5 @ 5½c net

Screws.
Flat Head Iron.....dis 55 %
" " Brass.....dis 50 %
Round Head Brass.....dis 3 %
" " Iron.....dis 45 %

Spoons.—
Plated.....dis 40 @ 40&5 %
German Silver.....dis 30&5 %
Britannia, Boardmans.....dis 50&10 %
" Parkers.....dis 50&10 %
Tinned.....dis 15 @ 20 %
" by case.....dis 20 %

Springs—Torrey.....℔ doz $2 00 @ 2 10 net
Philadelphia.....5 in., $5 00; 8 in., $7 00 ℔ doz. dis 25 %
Chatfield.....No. 1, $3 50; 2, $4 00; 3, $6 00 ℔ doz. net

Gem Coil No. 1, Large Jap'd.....℔ doz $3 50 }
" " No. 2, Medium Jap'd..... " 2 50 } dis
" " No. 3, Small..... " 2 00 }

Stocks and Dies.....dis 10&5 %

Stove Polish.—Gem.....℔ gross, $4 50, dis 5 %
Dixon..... " $6 00, dis 5 %
Onyx..... " $4 00 @ 4 25 net

Tacks, Brads, &c.
Tacks, Half Weight American.....dis 75 % }
" Full " ".....dis 50 % }
" Half " Swedes.....dis 65 % }
" Full " ".....dis 30 % } Extra
" Carpet, Am. and Swedes.....dis 20 % } 20@40 %
" " Leather Head.....net }
" Copper.....℔ ℔ 58c, net }
Brads, Half Weight.....dis 50 % }
Shoe Nails—
4-8 and larger, 9c; 3½-8, 9½c ℔ ℔, dis 20&10 %
Trunk, Clout and Finishing Nails—

½	⅜	¾	⅝	1	1⅛ and over
25,	20,	17,	15,	13,	11c ℔ ℔, dis 20&10 %

Double Pointed Tacks.....dis 40&5 %

Traps.
Genuine Oneida—Newhouse.....dis 30 %
Im. Oneida—Newhouse list (1st qual.).....dis 60 %

Vises.—Solid Box, Trenton.....℔ ℔ 11½ @ 12½c net

Wrenches.—
Girard (Coe's Pattern).....dis 50&10 %, case 50, 10&5 %
Agricultural—
℔ doz 10 in., $3 60; 12 in., $5 40 net; case dis 5 %
Coes' Genuine.....dis 50&10 %
" Pat. Wrot Bar.....dis 60&10 %
" Mall ".....dis 75&10 %
Taft's " Wrot ".....dis 75 @ 75&10 %
Phila. Tool Co., Duplex.....dis 25 %

Wire.—
Bright or Ann'd, No. 0 to 18.....dis 57½ @ 60 %
" " No. 19 to 26.....dis 60 @ 62½ %
" " No. 27 to 36.....dis 62½ @ 65 %
Coppered 0 to 18.....dis 52½ @ 50 %
Tinned Broom Wire.....dis 45 @ 47½ %
Galvanized, No. 7 to 18.....Market list, dis 30 @ 35 %

Wringers.—Novelty No. 10.....℔ doz. $60 00 net
Novelty No. 2..... " 63 00 net
Universal, No. 2½..... " 60 00 net
" No 3..... " 63 00 net

PITTSBURGH.

Merchant Iron.

Flat Bar.

1⅛ to 4x⅜ to 1 in.....1.80c	1¼ and 1⅜x⅜ to ¾ in. 1.90c
4¼ to 6x⅜ to 1 in.....1.90c	1 and 1⅛x⅜ to ¾ in... 2c
1¾ to 6x1⅛ to 1½ in...2.20c	⅝, ¾ and ⅞x⅜ to ⅝ in. 2.20c
Rounds and Squares.	⅝ to 9-16 in..... 2c
1 to 1⅞ in.....1.80c	½ to 7-16 in.....2.20c
2 to 2⅝ in..... 2c	⅜ in.....2.40c
2¾ to 3¼ in.....2.30c	5-16 in.....2.60c
3⅜ to 4 in.....2.80c	¼ in.....2.80c
¾ to ⅞ in.....1.90c	3-16 in.....4.80c

Horse Shoe Bar—all sizes.....2.80c

Heavy Bands.	1 to 1⅜x¼ and 5-16...2.10c
3⅛ to 6x¼ and 5-16 in. 2c	¾ to ⅞x¼ and 5-16...2.30c
1½ to 3¼x¼ & 5-16 in. 2c	⅝ & ½x¼ and 5-16...2.80c
Light Bands.	1 to 1⅜x⅛ to 3-16.....2.50c
3 to 6x⅛ to 3-16 in.....2.10c	¾ and ⅞x⅛ to 3-16 in..2.80c
1½ to 2¾x⅛ to 3-16 in..2.30c	⅝ and ½x⅛ to 3-16 in..3.30c

Same sizes X No. 11 and No. 12 2-10c. extra.

Hoop Iron.	⅝ & 9-16, Nos. 17 to 20..4.80c
⅝ & 9-16, Nos. 13 to 16..4.50c	¾ & 11-16, Nos. 17 to 20..4.30c
¾&11-16, Nos. 13 to 16.. 4c	⅞ & 13-16, Nos. 17 to 20..3.80c
⅞&13-16, Nos. 13 to 16..3.50c	1 and 1⅛, Nos. 16 to 19..3.40c
1 & 1⅛, Nos. 13 to 15..3.10c	1¼ to 2, Nos. 16 to 18..2.90c
1¼ to 2, Nos. 13 to 15..2.70c	2¼ to 3½, Nos. 13 to 15..2.80c

The prices under Hoop Iron do not apply to Cotton Ties.
1-10c ℔ ℔ extra for each gauge lighter.

Oval Iron.

⅞ to 1¼ in.....2.20c	½ in.....2.60c
⅝ to ¾ in.....2.40c	⅜ in..... 3c
Half Oval & Half Round	½ in.....3.30c
⅞ to 1¼ in.....2.50c	⅜ in.....4.80c
⅝ to ¾ in..... 3c	W'g'n Box Iron, ¾&⅞..3.30c

Sheet Iron. Com'n.	Charc'l		Com'n.	Charc'l
No. 10 to 14..2.60c	4.10c	No. 22 to 24..3.30c		4.80c
No. 15 to 17..2.80c	4.30c	No. 25 & 26..3.50c		5c
No. 18 to 21..3.10c	4.60c	No. 27.....3.70c		5.20c
		No. 28.....4.10c		5.60c

All Sheets, No. 18 and lighter, over 30 in. wide, not less than 2-10c. extra.

Wood's Patent Planished Sheet.
1st quality (A).....10½c | 2d quality (B).....9½c
Plate Iron—3-16 to ½ in. thick.....2.60c

Galvanized Iron-Juniata.

Nos. 14 to 20.....12c	No. 27.....15c
Nos. 21 to 24.....13c	No. 28.....16c
Nos. 25 and 26.....14c	No. 29.....18c

Common and imperfect Juniata, 45 to 50 % off. Discount, 30 to 40 %.

Roofing Iron, Corrugated or Crimped.

Galvanized Common.	Black.
No. 20.....7c, net cash	No. 20..... 4c
No. 21 to 24..7½&8c, "	Nos. 21 to 24.....4½c

Bridge Iron.

Carnegie Bros. & Co.'s list.

Beams and Channels.
Solid Wrought Iron Beams, 3 to 10½ in.x30 ft..℔ ℔ 3 c
" " " " 12 in. by 25 ft..... " 3
" " " " 15 in. by 25 ft..... " 3¼c
Deck Beams, 7 to 9 in. by 30 ft..... " 3 c
Channel Bars, 1¼ to 10 in. by 30 ft..... " 3 c
" " 12 in. by 30 ft..... " 3¼c

Tee Iron.
1 in.x1 in. to 5 in.x3 in.....℔ ℔ 2.90c

Angle Iron.
Equal Sided, 1x1 to 1¾x1¾ in.....℔ ℔ 2.7c
" " 2x2 to 4x4..... " 2.6c
Unequal Sided, 2x1¾ to 5x4..... " 2.6c
Square Root Angles, 2x2 to 3½x3½..... " 2.6c
Star Iron, 1½x1½ to 4x4..... " 2.7c
Sash Iron, 1¾x⅞x3-16..... " 3.25c
Miscellaneous Shapes, various shapes...℔ ℔, 2.6 to 3.5c

Nails.

Fence and Brads.

10d to 60d.....$2.50	4d and 5d.....$3.25
8d and 9d..... 2.75	3d..... 4.00
6d and 7d..... 3.00	2d..... 5.25
Barrel.	1⅛ in.....4.25
¾ in.....6.50	1¼ ".....4.00
⅞ ".....5.50	1⅜ ".....3.50
1 ".....5.00	1½ ".....3.25
Lining.	
⅞ in.....7.00	¾ in.....8.50
Tobacco Hhd.	8d.....3.25
10d.....3.00	6d and 7d.....3.50

Clinch—All sizes.....4.25

Slating.	
5d.....3.50	3d.....4.25
4d.....3.50	2d.....5.50
Finishing.	1⅛ to 1¾ in.....4.50
1 in.....7.50	2 in.....4.25
1¼ ".....6.50	2½ ".....4.00
1⅜ ".....4.75	3 " and over.....3.75
Casing and Box.	6d.....3.75
10d to 30d.....3.25	4d.....4.00
8d.....3.50	3d.....5.00
Fine Blued.	3d.....5.50
4d.....4.25	2d.....6.25

Cut Spikes—All sizes.....2.75
Boat Spikes—All sizes.....3.25
Each half keg 10 cents extra.

TERMS.—Note or acceptance at 60 days; or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice. An abatement of 10 cents per keg allowed upon orders of 200 kegs or over.

Steel.

Square, Flat and Octagon Tool Steel.

⅜ to 2 in.....13c	7-32 and 4⅛ 5 in.....16c
5-16 and 2⅛ to 3 in.....14c	3-16 and 5⅛ to 6 in.....19c
¼ and 3⅛ to 4 in.....15c	5-32 in.....24c

Single and Double Shear Nailers—Same as Tool.
Knife, Tap, Die, Mill Pick, Drill—Ordinary sizes.....13c

Machinery Steel—Round.

⅜ to 2 in.....7½c	7-32 and 4⅛ to 5 in.....10½c
5-16 and 2⅛ to 3 in.....8½c	3-16 and 5⅛ to 6 in.....13½c
¼ and 3⅛ to 4 in.....9½c	5-32 in.....18½c
Cast Spring Steel.	1⅛ to 3x5-32 to 3-16 in...7½c
1 to 4x¼ to ½ in.....6½c	⅞ to 1⅜x5-32 to 3-16 in..8½c

Agricultural Steels.
Solid Cast Steel Plow, 4 to 16 by 3-16 to ⅜ in..... 7c
"Iron Center Plow," 4 to 16x3-16 to ⅜ in..... 8c
"Iron Back Plow," 4 to 16x3-16 to ⅜ in..... 8½c
Soft Steel Center Plow, 4 to 16x3-16 to ⅜ in..... 9c
Landside and Cultivator, C. S., ½ in. thick..... 9½c
Circular Plow Coulters, 5-32 to ¼ in. thick..... 11c
Reaper and Scythe..... 13c
Fork and Hoe..... 7c
Horse Rake Teeth, to length..... 8c
Finger Bar..... 8½c
Cutter Bars, C. S..... 8½c
" " German Spring Steel..... 7½c
Cornstalk Cutter beveled to length..... 8c
Planters' Hoe, C. S..... 9c
Hoe, C. S..... 7½c

Sheet Steels.

German, 10 to 16 g..... 8c	Common C'st, 17 to 20 g. 10c
" 17 to 20 g.....11c	Best Cast, 10 to 16 g.....13c
Common C'st, 10 to 16 g. 9c	" " 17 to 20 g.....14c

Rolls and Castings.

Furnace, Floor and Straightening Plates.....1¾ @ 2c
Housings and Castings not otherwise specified....2½c
Guide Plates.....3 c
Spindles and coupling boxes.....2 @ 2¼c
Sand Rolls and Pinions, large size.....2½c
" " small size.....3 c
Pipe Mill Castings.....4 c
Rolling Mill Castings under 50 lbs.....3 c
Spur and Bevel Wheels, large.....3 @ 3¼c
" " small.....4 @ 4¼c
Pulleys up to 30 inches.....4 c
" over 30 inches.....3¼ @ 3½c
Engine Castings, light.....3¾c
" " heavy.....3¼c

Chilled Rolls.
6 to 7 in. diam., 7 to 20 in. long.....6 c
8 to 15 in. " 8 to 40 in. ".....5 c
15 to 24 in. " 15 to 72 in. ".....4 c
24 to 31 in. " 72 to 108 in. ".....4½c

Heavy Hardware.

Bolts, Screws, Nuts, etc.
Lewis, Oliver & Phillips, discount off Standard List.
Carriage & Tire Bolts, ordinary orders 75, & 3 % off net
Stove Bolts.....40&5 % off net
Elevator Bolts.....30 % off net
Machine and Square Head Bolts.....60&10 % off net
Coach and Lag Screws.....60&10 % off net
Bolt Ends.....60&10 % off net
Pat. Hot Pressed Sq. and Hex. Nuts.....8c ℔ ℔ off net
Washers, all made from new band iron..8c ℔ ℔ off net
Nuts and Washers in 25 ℔ boxes, ½c ℔ ℔ ex. Nuts and Washers in lots less than one keg each size, ½c ℔ ℔ ex. Nuts and Washers in 5 ℔ boxes, 1c ℔ ℔ ex.
Strap and T Hinges.....60&12½ % off net
Harrow Teeth.....net
Skein Bolts.....net
Cast Iron Washers.....3¼c ℔ ℔ net
Fire Shovels and Pokers.....50 % off

Wagon Hardware.
Single Trees, Neck Yokes and Double Trees, made from best selected hickory, and ironed complete, in the most approved patterns.
No. 1 Southern Plow Single Tree, Ironed complete, Irons all Wrought.....each, 25c net
No. 2 Western Plow Single Tree, Ironed complete, Irons all Wrought.....each, 35c net
No. 3 Wagon Single Tree, Iron complete, Irons all Wrought, except Malleable Ferrule.....each, 50c net
No. 4 Wagon Single Tree, Ironed complete, Irons all Wrought; Improved End Pieces riveted on; one side acts as a wear iron for wheel to rub against.....each, 50c net
Neck Yoke, Ironed complete, Irons all Wrought except End Ferrules, with Wt. Iron Rings.....each, 60c net
Southern Plow Double Tree, Ironed complete, Irons all Wrought.....each, 50c net
Wagon Box Strap Bolts—
For orders of 100 Set, 45&10 % dis.

10 in. long by	7-16 at Screw End, ℔ set of	8	bolts..	45c
12 in. "	½ "	8	" ..	55c
10 in. "	9-16 "	8	" ..	65c
12 in. "	9-16 "	8	" ..	70c
14 in. "	9-16 "	8	" ..	80c
10 in. "	⅝ "	8	" ..	80c
12 in. "	⅝ "	8	" ..	80c
14 in. "	⅝ "	8	" ..	90c
16 in. "	⅝ "	8	" ..	1.00
18 in. "	⅝ "	8	" ..	1.10
20 in. "	⅝ "	8	" ..	1.20

5c ℔ set for each additional inch over 14 inches. All lengths made.

Chains, Straight or Twist Link.
Reiter & Morton's List.

5-16.....7c	½.....5¾c
⅜.....6c	9-16.....5½c
7-16.....6c	⅝.....5c

Net cash, 30 days.

Horse Shoes, Etc.—In 100 keg lots.
Juniata Horse Shoes.....per keg, $3.25
" Mule ".....4.25
Steel Toe Calks.....per 7½c lb.
Thistlewood & Co.'s Self-Sharpening Horse Shoes.....per keg, $5.25
Thistlewood & Co.'s Self-Sharpening Snow Shoes..... " 5.50
Toe Calks.....per lb. 8c

White and Red Lead.
Assorted Kegs (all sizes).....8c
25 ℔ Tin Pails, 100 ℔ Cases.....8½c
12½ ℔ Tin " ".....9c
Red Lead.....in kegs, 7¾c; in barrels, 7½c.
Orange Mineral..... " 10c: " 9¾c.
Litharge..... " 7¾c; " 7½c.
Dry White Lead..... " 7¾c; " 7½c.

Window Glass.
Per Box of 50 Feet.—Discount 70 % @ 70&10 %.

Single Strength. Size.	AA.	A.	B.	C
6 x 8 to 10 x 15.....	$7.50	$6.75	$6.25	$5.7[illegible]
11 x 14 to 16 x 24.....	8.50	7.75	7.25	6.5
18 x 22 to 20 x 30.....	10.75	9.75	8.75	7.7[illegible]
15 x 36 to 24 x 30.....	12.25	10.75	9.00	
26 x 28 to 24 x 36.....	13.00	11.50	9.75	
26 x 36 to 26 x 44.....	14.50	13.25	10.75	
26 x 46 to 30 x 50.....	15.00	14.00	11.25	
30 x 52 to 30 x 54.....				
30 x 56 to 34 x 56.....				
34 x 58 to 34 x 60.....				
36 x 60 to 40 x 60.....				
Double Strength.				
6 x 8 to 10 x 15.....	12.00	11.00	10.00	25
11 x 14 to 16 x 24.....	13.75	12.50	11.75	10.50
18 x 22 to 20 x 30.....	17.25	15.75	14.00	
15 x 36 to 24 x 30.....	19.75	17.25	14.50	
26 x 28 to 24 x 36.....	21.00	18.50	15.75	
26 x 36 to 26 x 44.....	23.25	21.25	17.25	
26 x 46 to 30 x 50.....	24.00	22.50	18.00	
30 x 52 to 30 x 54.....	25.75	23.25	19.25	
30 x 56 to 34 x 56.....	27.75	25.00	21.75	
34 x 58 to 34 x 60.....	29.25	27.75	24.00	
36 x 60 to 40 x 60.....	33.25	30.00	27.75	

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length and not making more than 81 united inches, will be charged in the 84 united inches bracket.

CHICAGO.

(The Chicago Stamping Co., 72, 74 & 76 Lake St.)
Jan. 16, 1878.

Tin Plate.—

10x14, IC, Ch'l. Good $	14x20, IXX. Ch' Best. 12 00
10x14, IC, " Best. 7 00	14x20, IXXX. " " . 14 50
10x14 IX, " " . 9 50	DC, 100 Plate " " . 7 00
12x12, IC. " " 7 00	DX. " . 9 50
12x12, IX, " " . 9 50	DXX. " " . 12 00
14x20, IC. " " . 7 00	DXXX. " " . 14 50
14x20, IX. " " . 9 50	IC, Roofing, " " . 6 75
	IX. " " " . 9 25

20x28, IC, Charcoal Roofing, Good.....
20x28, IC, " Best..... 14 00
20x28, IX, " "..... 18 50
10x14, IC, Coke Plates..... 6 50
14x20, IC, "..... 6 75
10x20, IC, "..... 10 50

Block Tin.—
Large Pigs..... 20c | Bars.....22c
Small.....21c

Zinc.—Sheet, 500 to 1000 ℔. Casks..... 6½c
Loose Sheets..... 7 c
Slab Zinc or Spelter..... 6 c

Copper.—Bottoms.....29c
Sheathing.....26c
Planished.....31c
" Boiler length.....36c
Bolt.....28c

Braziers' Sheets.—
30x60, 6 to 7 lbs.....℔ ℔ 34c | 30x60, 10 to 12 lbs...℔ ℔ 30c
30x60, 8 to 9 lbs..... " 32c | 30x60, 15 to 100 lbs. " 28c

Solder.—F. S. & Co.'s make
Best Fine.....15c
No. 1.....14c
Roofing.....12c
Braziers or Spelter Solder.....30c

Antimony.....16c

Babbit Metal—F. S. & Co.'s.....12c
No. 2.....10c

Sheet Iron.—

	Common.	Smooth. Com.	Smooth Charcoal.	Smooth Juniata
No. 24.....	3 20c	4 20c	6 c	8 c
25 & 26...	3 40c	4 40c	6¼c	8¼c
27.....	3 60c	4 60c	6½c	8½c

Galvanized Iron.—dis 40 %

No. 16 to 20.....12c	No. 27.....15c
21 to 24.....13c	28.....16c
25 & 26.....14c	

Russia Iron.—
Perfect.....12½c | No. 1 Stained.....11c
In Sheets, 1c. higher.

American Russia.—
A.....11c | B.....9½c
in sheets, 1c higher.

Lead.—
Pig.....5 c | Lead Pipe, in full coils 6
Bar.....6 c | Lead Pipe, when cut.. 6½
Sheet Lead..... 6½

Wire—Bright.....dis 50 %
Coppered.....dis 45 %

D. W. Hazelton & Co.,

724 Girard Ave., PHILADELPHIA, PA.,

MANUFACTURERS OF

CURRY COMBS,

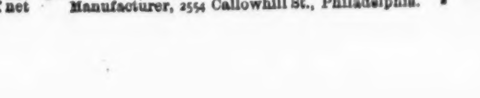
PATENT

Adjustable Lock Elbows for Stove, Heater and Conductor Pipes.

Flat and Rimmed Wash Boiler Covers. Stamped Ware and Wood Frame Graters. Pat. Metallic Wash Boiler and Kettle Bottoms. Stamped and Press Work to order. Correspondence solicited.

BROWNING'S

Patent Self-Adjusting Pipe Tong, Wrench and Ratchet Drill.



This tool is made on an entirely new principle, and is pronounced superior to any tool made for the purpose.
JOSEPH BROWNING,
Manufacturer, 2554 Callowhill St., Philadelphia.

AMERICAN MANUFACTURES FOR EXPORT.

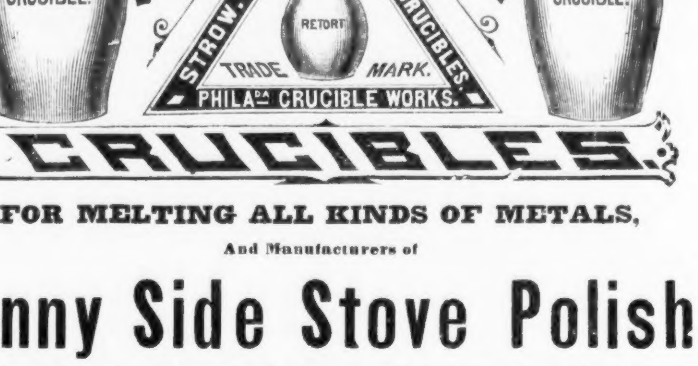
Machines, Tools, Axles, Springs, Carriage Hardware, Carriage Woodwork, Hubs, Spokes, Felloes, Rims, Shafts, Poles, Hardwood Lumber,

AND ALL ARTICLES MADE FROM

Wood, Iron or Metals.

Guy C. Hotchkiss, Field & Co.

74 to 85 First St., AND 1 to 11 S. 9th St., BROOKLYN, E. D.
527 Hudson St., AND 250 Water St., NEW YORK.



FOR MELTING ALL KINDS OF METALS,

And Manufacturers of

Sunny Side Stove Polish.

Lumber Pencils, Foundry Facings and Lubricating Plumbago.

WILE, SIEDEL & CO.,

Nos. 1324, 1326, 1328, 1330, 1332 & 1334 Callowhill St., Phila.

GENERAL AGENTS:

Messrs. HALL & CARPENTER, 709 Market St., Phila.

WM. F. FOREPAUGH, JR. & BROS.

Manufacturers of SUPERIOR OAK TANNED

LEATHER BELTING.

Best Quality Lace and Strap Leather on Hand, Rivets, Belt Hooks, Dubbing, &c.
N. W. Cor. Randolph and Jefferson Sts., PHILADELPHIA.
☞ All Belts Warranted. Orders by Post immediately attended to.

Morse Twist Drill and Machine Co.,

NEW BEDFORD, MASS., Sole Manufacturers of

Morse Patent Straight-Lip Increase Twist Drill,

Beach's Patent Self-Centering Chuck, Solid and Shell Reamers.

BIT STOCK DRILLS,

Drills for Coes, Worcester, Hunter and other Hand Drill Presses. Beach's Patent Self-Centering Chucks, Center and Adjustable Drill Chucks, Solid and Shell Reamers. Drill Grinding Machines. Taper Reamers, Milling Cutters and Special tools to order.

All Tools exact to Whitworth Standard Gauges.

GEO. R. STETSON, Supt. EDWARD S. TABER, Treas.

FOR SALE.

Patents of Root's Wrought Iron Spiral Pipe.

The Abendroth & Root Manufacturing Company, sole owners of the Letters Patent, and manufacturers under the same, of Root's Spiral Metallic Tubing, grooved and riveted seam, now offer for sale the territory west of the Rocky Mountains, in the United States, and the Letters Patent issued for Canada and all other foreign countries, together or separately, including complete working drawings or machinery (if required) for manufacturing.

The success of this company in the introduction of Spiral Tubing throughout the States and Territories east of the Rocky Mountains, is a sufficient guarantee that the business cannot be otherwise than successful wherever entered into.

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ABENDROTH & ROOT MFG. CO.,

28 Cliff Street, New York.

Bucket Plunger.

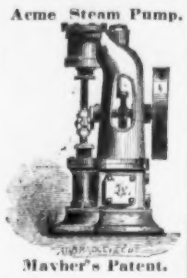
VALLEY MACHINE CO.

STEAM PUMP

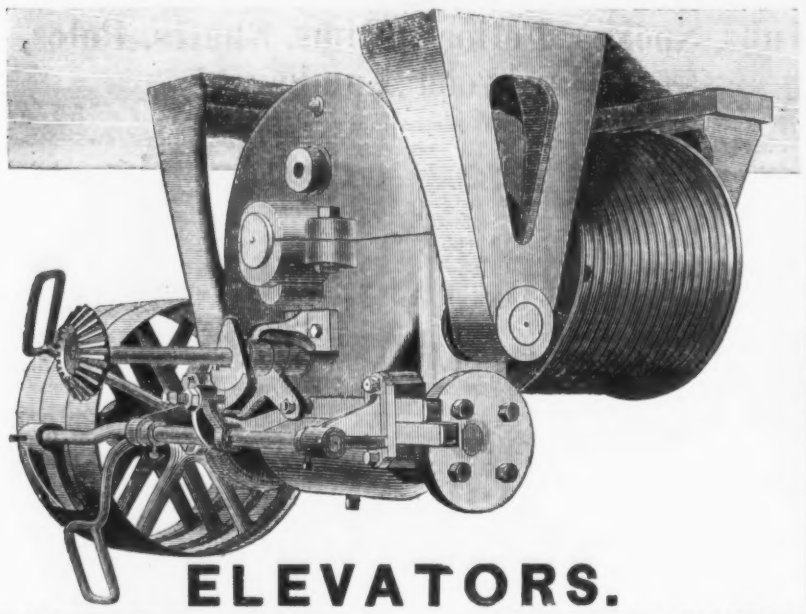
Manufacturers,

Easthampton, - Massachusetts.

Acme Steam Pump.



Wright's Patent. Mayher's Patent.



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PASSENGER ELEVATORS. FREIGHT ELEVATORS.

INDEPENDENT STEAM ELEVATOR ENGINE.

Hydraulic Elevators to run from City Pressure; Condensed Air and Hydraulic Elevators operated by Steam Pump; Independent Steam Elevators; Belt Power Elevators; Portable Hoisting Machines. All kinds of HOISTING MACHINERY a specialty.

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NORTH'S PATENT

Universal Lathe Dog.

It is very strong. Holds very strong. Will not deface finished work. Holds round, square or irregular work. Always stands up square with the work and will not "skew." Is more evenly balanced than the common dog.

Send for circular.

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The only **GENUINE D. R. BARTON** Tools

ARE MADE BY

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The Stamped Stove Pipe Elbow,

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The Stamped Elbow has neither Crimps, Cavities nor Angles which cause accumulations that rust or corrode the Iron.

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Hydraulic Jacks

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Roller Tube Expanders and Direct Acting Steam Hammers.

Communications by letter will receive prompt attention.

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Made by THE VICTOR SEWING MACHINE CO.

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This attractive and very desirable tool will be found more reliable and convenient than the Vernier Caliper, and to Machinists and Tool makers it is indispensable on work requiring very accurate and close measurement. Its capacity is one inch, and is graduated to one thousandths, but can readily be set one-half and quarter thousandths; and is so constructed that any wear resulting from use can be readily adjusted.

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(Double and Single Gate, ⅜ in. to 48 in.—outside and inside Screws, Indicator, &c. for Gas, Water and Steam. Send for Circular.

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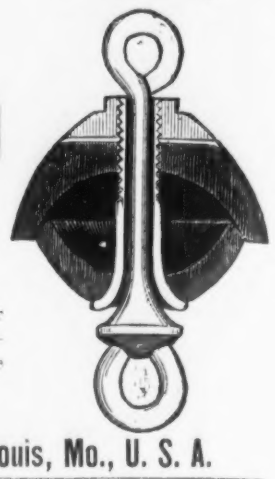

These Patents cover the use of the Rubber, the use of the Nut and Bolt for expanding, the use of the Tube and Valve for draining. All others are infringements, and manufacturers and dealers in infringing Buckets will be prosecuted to the full extent of the law.

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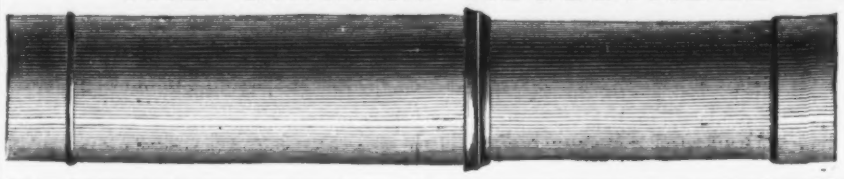

(Pat. Jan. 9, 1877.)

Medal Awarded at American Institute, 1877.

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ESTABLISHED 1844.

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(Formely of TODD & RAFFERTY)

Engineer & Machinist

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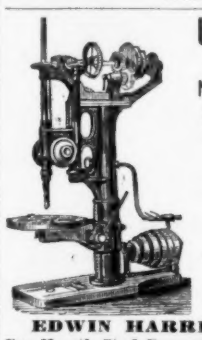
I also manufacture

BAXTER'S

New Portable Engine

of 1877, of one horse-power, complete for $125; can be seen in operation at my store. I will furnish specifications and estimates for all kinds of Machinery. Send for descriptive circular and price. Address **J. C. TODD,** 10 Barclay St., N.Y., or Paterson, N. J



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A Splendid Tool. CHEAP.

Send for circular.

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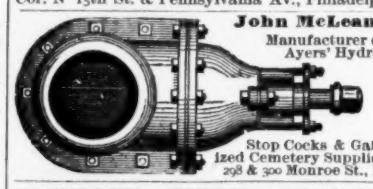

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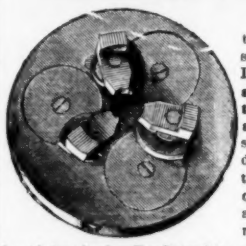
Manufacturer of Ayers' Hydrants

Stop Cocks & Galvanized Cemetery Supplies

298 & 300 Monroe St., N. Y

JOHNSON'S PATENT UNIVERSAL LATHE CHUCK.



We invite attention to the superior construction of this chuck. Its working parts are **absolutely protected from dirt and chips.** It is strong, compact and durable, and will hold the greatest variety of work, as the jaws are adjustable with a range the full diameter of the chuck. For Price List address,

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FINE TOOLS

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All Styles and Sizes.

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THE

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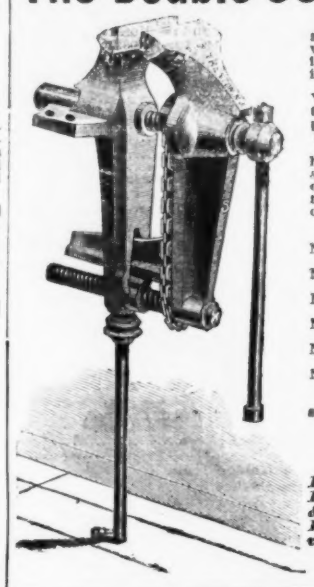
CENTENNIAL EXHIBITION PRIZE MEDAL AWARDED.

WARRANTED.

The Double Screw Parallel "Leg" Vise



Stronger than any other, whether of Foreign or of American make; always parallel and holding with a tighter "grip." The jaws are of convenient shape for the workman to get near his work equally well for filing or chipping, instead of the heavy, clumsily formed jaws of the cast iron Single Screw Vises of the common "parallel" type.

Our Vise combines all the advantages of the "Peter Wright" Leg Vise, of strength and lightness, fastening to the floor and bench, and at the same time greatly superior to it; is always perfectly parallel at all points of opening, and never gets out of line. *We now warrant these Vises for three years from date of manufacture* stamped upon each.

The Jaws are of best Tool Cast Steel, welded on, file cut and properly hardened. The screws are forged of the best refined iron, and work in *solid cut thread* boxes. The lower screw maintains the parallel position of the two jaws, by having exact motion with the upper working screw through the connecting chain which regulates it. The chain has no strain of the work upon it, and is therefore as durable as all the other parts.

REDUCED PRICE LIST.

No. 1, Jaws 3¼ in. x ¾ in., Screws ⅝ in. diameter, Lever 9 in. long, opens 4¼ in. $7 00
No. 2, Jaws 4¼ in. x 1 in., Screws 1⅛ in. diameter, Lever 13 in. long, opens 5¼ in. 11 00
No. 3, Jaws 5¼ in. x 1⅛ in., Screws 1¼ in. diameter, Lever 16 in. long, opens 6¼ in. 16 00
No. 4, Jaws 6¼ in. x 1¼ in., Screws 1¼ in. diameter, Lever 19 in. long, opens 7½ in. 20 00
No. 5, Jaws 7 in. x 1½ in., Screws 1½ in. diameter, Lever 24 in. long opens 9 in. 27 00
No. 6, Jaws 8 in. x 1½ in., Screws 1½ in. diameter, Lever 26 in. long, opens 10 in 30 00

All sizes of these Vises furnished with Swivel Attachment at same price.

THESE GOODS ARE SOLD BY THE GENERAL AGENTS (with special discounts to the trade.)

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FISHER & NORRIS, Sole Manufacturers, Trenton, N. J

H. S. MANNING & CO.,

Sole Sales Agents for **THE MORSE TWIST DRILL AND MACHINE CO.'S**

Manufacture of Patent Machine Relieved Nut, Hand, Blacksmith and Machine Screw Taps, Screw Plates, Tap Wrenches and Patent Relieved Pipe Taps and Pipe Reamers, also of Solid Bolt and Pipe Dies. Furnished either in **V** or U. S. Standard shape of threads.

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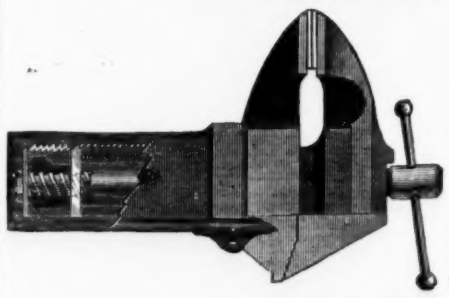
Pat. Nov. 1st, 1870; Feb. 12th, 1877.



PARALLEL Swivel and Coachmakers' VISES.

The Best Rapid Adjustable Vise in the Market.

Simple and durable. No chance of getting out of order. No toggle or cam movements or parts. A trial will convince.

MANUFACTURED BY THE

TRENTON VISE & TOOL WORKS, Trenton, N. J.

Address orders to

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PORTABLE DRILLS. Driven by power in any direction.
RADIAL DRILLS. Self-feed—Large Adjustable Box Table.
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MULTIPLE DRILLS. 2 to 20 Spindles.
HORIZONTAL BORING AND DRILLING MACHINES.
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SPECIAL DRILLS. For Special Work.

GEO. M. SCOTT,

Bellows Manufacturer,

Johnson Street,

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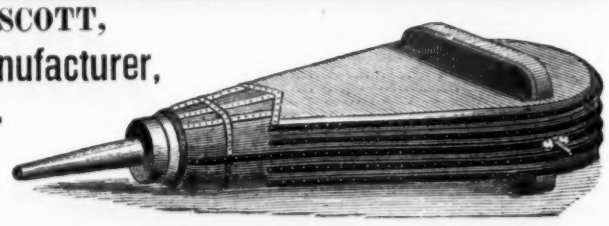
CHICAGO, ILL.



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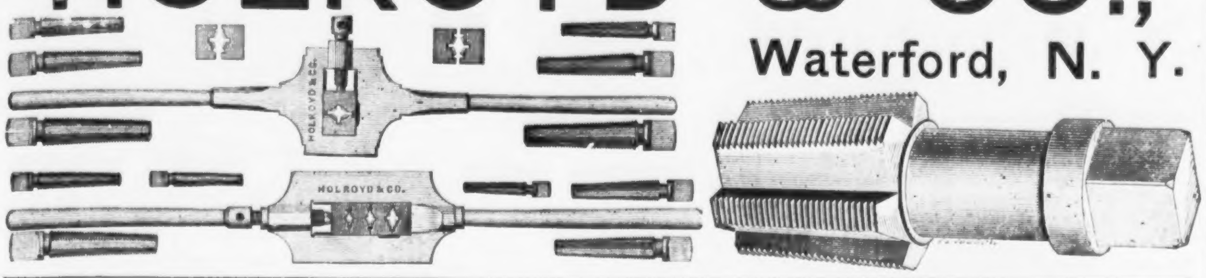

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At Lowest Prices.

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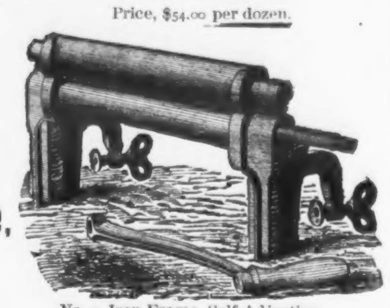

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CLARK'S PATENT EXPANSIVE BITS

Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other
Two sizes: Large Size Boring, ⅞ to 3 inches; Small Size Boring, ⅜ to 1⅜ inches.

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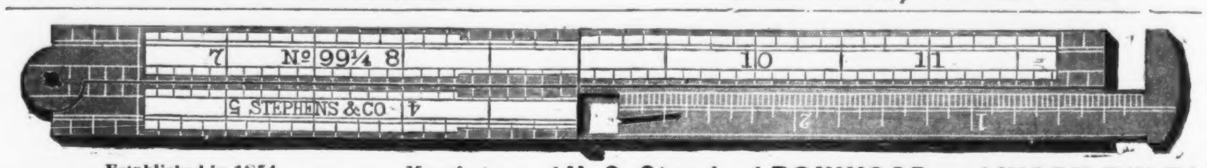

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Rules graduated in foreign measure to order. RIVERTON, CONN.
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Of every description, including

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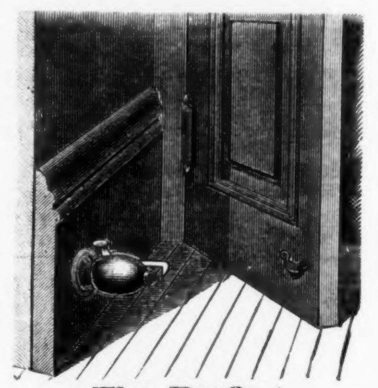

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Will catch and hold the door every time, and *no wind can blow it loose.* It saves the *wall,* the *paper, glass* and slamming of doors. **Liberal Discount to the Trade.** Address,
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Manufacturers of
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PERFORATED CROSS-CUT SAWS
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TIRE BENDERS.

FINE GRAY IRON CASTINGS of all kinds made to order.

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Anvils.—"Eagle American"........per lb. 9c; dis 20 %
Anvils and Vise (combined).
No.................1, $4·50; 2, 3·75; 3, 3·00 each, dis 25 %
L'Hommedieu Ship..........dis 15 %
Axes.—Blue Jacket..........9 00
Racer..........8 00
Red Cross, Handled..........10 50
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Blue Jacket "..........10 00
Axe Handles.—Wadleigh's Oak—
A (Extra) $2·50, B (No. 1) $2·00, C (No. 2) $1·50 ℔ doz
Blind Hinges.—Orr or Washburn's..℔ hun'd sets $6 50
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Orr or Washburn's..........per hundred set $4 50
Bolts.—Carriage, Phila..........dis 60&20 %
Carriage Common..........dis 75 %
Borax.—Best Refined..........℔ ℔ 10c
Borers.—Angle, Backus'..........dis 30 %
Boring Machines.—Angle..........each $4 50
Common, Snell's quality..........each 3 50
Braces.—Barber's..........dis 40&5 %
Backus'..........new list 50&10
Spofford's..........dis 50 %
Bracket
Saw Frames, with patterns complete.......℔ doz $5 50
Saws.......... " 88
Star Bronzed..........new list net
Star Japanned..........new list net
Store Shelf..........new list net
Brass Faucets.—L. F. & C..........dis 50 %
Brushes.—Horse, Patent Metallic..........per doz. $4·50
Butts.—Union Drilled Loose Joint..........dis 66⅔ & 10%
" " Wire Fast Joint......dis 50&10 %
" " Acorn Loose J't......dis 65&10 %
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Wrought Table Butts and Back Flaps..........revised list, dis 35 %
Wrought Narrow Butts..........reduced, dis 40 %
Cards.—
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Cotton " No. 10, " 3·50..........dis 10 %
Cartridges.—U. S. Cartridge Co..........dis 60 %
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Cow Ties..........dis 30 %
Dividers.—Cook's Nickel Plated..........dis 15 %
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Per doz..........$9·00 12·00 15·00 18·00 24·00
No.......... 0 1 2 3 4
Torrey's..........$2·50
Gem..........dis 10 %
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Files.—American..........dis 35 %
Nicholson, new list..........dis 35 %
Wheeler, Madden & Clemson..........$5 to £; 10 %
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Hammers.—Maydole—new reduced list..........dis 15 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $8·75..........dis 25 %
M., B. & D., solid cast steel, bell face, No. 1 $11; 1½, $9·75.
Hammond—new reduced list..........dis 15 %
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Climax..........dis 40 %
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C. F. Dowse, warranted Cast Steel—
Shingling..........0, $4·75; 1, $5·25; 2, $5·75
Claw..........1, 5·75; 2, 6·25
Lathing..........1, $5·50
Axe Pattern..........1, $7·00; 2, 7·50
Broad....0, $5·75; 1, $6·50; 2, $7·50; 3, $9·25; 4, $10·75; 5, $12·75; 6, $14·75
Hinges.—Strap and T Stanley Works..........dis 60 %
Plate, Loose and Fast Joint..........℔ ℔ 5c
Wrought Screw Hook..........℔ ℔ 5c
Knobs.—Imp. Extension Silvered Glass....℔ doz $8·00
Lanterns.—Tubular No. 0..........$10·00
Guarded, No. 74, (with kerosene oil and candle burners)..........5·50
Lead.—Sheet, 6c.; Pipe, 6c..........dis 10 %
Locks.—Norwalk Lock Co..........dis 50 %
Mattocks.—
K. P. & Co., axe finish, long cutter..........$10 00
Short cutter..........9 50
Pick..........10 00
Meat Cutters.—"Miles's" Challenge..........dis 30 %
No. 1, $22·00; 2, $30·00; 3, $40·00.
Metal.—Babbitt..........No. 1, 35c; 3, 25c; 5, 15c ℔ ℔
Nails.—10d and larger..........$2 40
Nail Pullers.—Little Giant—Small.....per doz., $22·00
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Picks.—K. P. & Co., Solid Eyes..........5 to 6 6 to 7 $7 50 $8 00
Pins.—Universal Hat and Coat all wood—
2 in........℔ gross $2·50; 3 in., 3 50; 4 in., 4 50—dis 15 %
Planes.—Auburn Tool Co..........dis 30 %
N. Y. Tool Co..........dis 30 %
Plated Ware.—Rogers Bros..........dis 40 %
Pocket Knives.—Conn. Cutlery Co.......new net list
American Shear Co..........dis 40 %
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Pulleys.—Axle.
Fr'me pol. wh'l pt. face No. 15, ⅞ in., 20c.; 16, 2 in., 26c.
Pol. wh'l br'zed face No. 115, 1⅞ in., 20c.; 116, 2 in., 26c.
Pulley Blocks.—"Best Boston Make"..........ne
Rail Barn Door.—For Novelty and Anti-Friction Hangers..........per foot 7c.. dis 40 %
Refrigerators.—Heinz Patent..........dis 25 %
Rivets.—Black, in papers..........dis 50 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8. dis 40 % 13 13 14 14 15 16c ℔ ℔
Sad Irons.—Bless & Drake..........℔ ℔ 2⅜c
Sand Paper..........dis 15 & 5 %
M. B. & D..........0 to 2, $4·25; 2 to 3, $4·75
Saws.—*Hand and Panel*—
X Cut, Wheeler, Madden & Clemson..........per ft., 40c
" Champion.......... " 40c
" Lightning.......... " 45c
" Great American.......... " 50c
Wood Saws, Welsh & Griffith..........℔ doz $14·00
Wheeler, Madden & Clemson's, same list as "Disston's"..........dis. 20 %
Disston's..........dis. 20 %
Saw Horses.—Extra..........℔ doz $2·25
Folding..........3·50
Screws.—Am. Screw Co., new list Sept. 1st....dis 55 %
Aiken's..........dis 55 %
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"Willoughby Lake," first quality..........℔ gross $6·50
" second quality.......... " 3·00
Shovels.—O. Ames..........dis 33⅓ %
M. B. & D..........dis 33⅓ %
Spading Forks.—W. C. & Co., new list..........dis 15 %
Tools.—Aiken's Pattern..........℔ doz $5·00
Aiken's Genuine, $12..........dis 40&10 %
" " Saw Sets, $13..........dis 40&10 %
" " Pocket Wrenches, $8.....dis 50&10 %
Traps.—Oneida..........dis 30 %
Blake's..........dis 50 %
Vises.—K. P. & Co.'s Solid Box. Blacksmith...℔ ℔ 10½c
Parker's Parallel..........dis 10 %
Backus..........dis 25 %
"Howards," Parallel..........dis 25 %
Wardrobe Hooks.—Wire to drive......℔ gross $1 00
Weights.—Window Weights..........℔ ℔ 1⅜c
Wedges—Axe..........℔ doz 3·0
Wire.—
Eureka in spools, No. 28 to 40 assorted...℔ gross $3 50
Wire Netting.—Clinton Wire Cloth Co., Green, 3⅜c
Drab or Black..........℔ ft 3⅜c
Wrenches.—A. G. Coes & Co..........dis 50&10 %
"Girard"..........dis 50, 10&10 %
Agricultural..........No. 10, $3·60; 12, 4·80, net
Wringers.—
Universal XX No. 2..........℔ doz $63 00; 2½, 60 00
Novelty, No. 10..........℔ doz 60 00
" No. 2.......... " 63 00
" No. 22.......... " 67 00
Excelsior..........A, $84 00; B, 92 00; CC, 114 00 ℔ doz
" E, set tubs..........℔ doz 66 00
Eureka..........54 00
Withington, Cooley & Co.—Hoes, Rakes, Forks, &c. dis 40 %. Special rate for Export.

ST. LOUIS.

Corrected weekly by Semple & Birge Mfg. Co.

Animal Pokes..........$6·50 ℔ doz. net
Apple Parers.—Conqueror..........℔ doz $6 75
Hudson's Rotary.......... " 6 75
Axes.—Wm. Mann's, Red Warrior..........℔ doz 9 50
"C. Marshall".......... " 9 00
Handled.......... " $5 extra
Double Bitted.......... " 19 00
Hunt's.......... " 12 00
Axles.—"Jones, Henry & Co.'s" Patent Lubricating, Half Patent Swelled Taper, Plain Taper and Concord Axles..........dis 35 %
Common Axles (Pat. Lubricating), 1½ inch and upward..........℔ ℔ 5½c
do. less than 1½ inch.......... " 5⅝c
Babbitt Metal.—
Nos.......4 8 3 1 A 1 Genuine.
9½ 11 16½ 20 31 34c ℔ ℔.
Bellows.—Best St. Louis make, new list......dis. 15 %
Bells.—Troy, Church, School and Farm Bells..℔ ℔ 30c
"Improved Amalgam Bronzed" 15 in., $2·00; 17 in., $2·50; 19 in., $4; 21 in., $5; 24 in., $14
Belting.—"Boston Belting Co.'s" Rubber. dis 50&10 %
Bradford & Sharp's" Oak-Tanned Leather.... dis 35 %
Blue Grass Strippers.—Hand Machines ℔ doz $27 00
Boilers.—Farmer's Profit Feed Boilers........dis 20 %
" Caldrons..........dis 25 %
" Sugar Kettles..........dis 30 %
Bolting Cloth.—New gold list..........net
Bolts.—Arms, Bell & Co.'s Carriage & Tire......dis 75 %
Broadcast Seeders.—Cahoons Patent Hand dis 25 %
Power dis 30 %
Buggies.—Favorite Corduroy finish..........$110 00
" Leather..........115 00
" " & top..........140 00
Churns.—Julien, No. 2, $7·00; No. 3, $7·50; No. 4, $8·50..........dis 25 %
Cider Mills.
Buckeye Senior $27·00 Buckeye Junior. 18·00.....net
Coffe Roasters.—Sperry's..........dis 20 %
Corn Stalk Cutters.—"Perkin"..........dis 25 %
Corn Drill.—"Campbell"..........$19 00
Corn Knives.—Dunn Edge Tool Co.'s Clip...℔ doz 4 50
Seymour Mfg. Co.'s Solid Steel Back.......... " 4 50
Corn Planters.—"Champion" Horse..........$44 00
St. Louis Hand....℔ doz $13 00
Corn Shellers.—Sandwich Mfg. Co.'s—
Power Shellers..........dis 10 %
Hand Shellers..........Special rates
Cotton Gins.—Carver, with 10 in. Saws, $3 25 a saw, net
12 in. Saws, $4.00 a saw..........net
Cultivators.—"Buckeye" 4 shovel....... 3 . $29 25
Crow Bars.—Steel Pointed..........℔ ℔ 6
Drag Saw Machines.
Culver's Dog Drag Saw..........dis 30 %
Excelsior Drag Saw with Log Trucks..........dis 20 %
Fanning Mills.—Nash & Cutt's..........dis 25 %
Feed Cutters.—Burdick National..........new list, net
Sanford No. 1, $9 25; No. 2, $7 25..........net
Bowman's Lever Cutter, $6·25..........net
Files.—Black Diamond, Mill..........dis 30%
" Bastard..........dis 30 %
" Taper..........dis 30 %
Forges and Blowers.
Keystone Portable Forge Co.'s..........dis 5 %
Forks and Hoes.
Auburn Mfg. Co.'s Hay and Manure Forks new list..........dis 15 %
Auburn Mfg. Co.'s Handled Hoes. ..new list, dis 15 %
Garden Seed Drills and Wheel Hoes.
Allen's Double Wheel Hoe..........new list, dis 20 %
" Planet Drill, Nos. 2 and 3......new list, dis 20 %
" Combined Drill and Wheel Hoe " dis 20 %
Grain Register.—"Excelsior"..........$13 00
Grinding Mills.—Challenge Feed Mills..........dis 20 %
Sedgebeer's Nonpareil Mills..........dis 20 %
Bradford's French Burr Mills..........dis 5 %
Osage Corn & Cob Mill..........$34 00
Handles.—No. 1 Fork, Hoe and Rake.new list, dis 25 %
No. 2 Fork, Hoe and Rake..........new list, dis 30 %
Ax, Pick, Sledge and Small Handles..........n. t list
Hand Carts.—"Champion"..........dis 10 %
Hay and Cotton Presses.
Dederick's Railroad..........dis 10
" Perpetual..........dis 10
Hay Knives.
Dunn Edge Tool Co.'s..........℔ doz $12 00 net
Lightning (Weymouth's Patent)..........℔ doz $19 00
Horse Nails.—National Patent Pointed..... 20c rate
National Patent Pointed, extra finished...... 22c "
Horse Powers.—Pitts or Carey's Patent.......dis 10 %
Wheeler's Railway..........dis 10 %
Sandwich Lever..........dis 10 %
Hose.—
Boston Belting Co.'s Rubber Medium Sizes.....dis 50 %
" " S. Siz. Hydrant..dis 60 %
Ice Tools..........new list net
Lawn Mowers.—Charter Oak & Archimedian dis 30 %
Money Drawers.—
Pierpont & Co.'s Excelsior..........per doz $33·00 net
Nails.—Wheeling Riverside Brand..........$2 55 rates
Packing.—Boston Belting Co.'s Rubber, Plain..dis 50 %
Boston Belting Co.'s Rubber, Pure..........dis 25&5 %
" " No. 3 Plain..........dis 40 %
" Round and Square..........dis 40 %
Plows.—Avery's Cast and Steel..........new list, dis 20 %
Avery Sulky Plow..........new list, dis 25 %
Collins Cast Cast Steel..........new list net
Plow Sulky.—Buckeye..........$27 00 net
Post Hole Augers.—Clark's Patent—
No. 1, ℔ doz. $27; No. 2, $30; No. 3, $32. ...... dis 25 %
Pulleys.—5 inch..........per doz $3·70 net
4 inch..........per doz 2·50 net
Pumps.—St. Louis, Farm, Patent Metal Lined..dis 30 %
Rakes.—Advance Sulky..........each $24 00 net
St. Louis Revolving 14 tooth..........4 15 net
" " 16 "..........4 65 net
" Hand Hay Rake..........per doz $2·50
Reaper Knives and Sections.—
Geo. Barnes & Co.'s Knives..........dis 40 %
" " Sections..........dis 40 %
Road Scrapers.—Steel..........each $8·00
Cast Iron..........dis 10c %
Saws.—Curtis & Co..........dis 15 %
Scythes.—Dunn Edge Tool Co.'s..........dis 25 %
Shovels and Spades.—Groom Shovel Co. dis 40 %
Grain Scoops—Patent Cor'd Straps Groom Shovel Co. ....dis 40 %, and 50c per doz extra
do. M. Rowland & Co., dis 30 % and 50c "
Snaths and Cradles.—Seymour Mfg. Co.'s..dis 25 %
Sorghum Machinery.—Bell Cane Mills..........dis 20 %
Scantlin's Seamless Pans and Evaporators..........dis 20 %
Springs.—Cleveland Spring Co.'s—
Carriage and Express..........℔ ℔ 4 c
Steam Engines.—Bookwalter..........dis 5 %
" Trade..........dis 10 %
" Mansfield..........dis 10 %
Thimble Skeins.—Whitewater's..........dis 40&10 %
Wheelbarrows.—Champion Iron Wheel..℔ doz $19·50
Champion Wood Wheel..........℔ doz 27·50
" Garden..........℔ doz. 30·00
Wagons.—Whitewater Farm Wagons—
Thimble Skein—
2⅞ in. $66; 3 in. $67.50; 3¼ in. $70; 3½ in. $71
Wire Bale Ties.—Buckeye Double Twist... net list
Dederick Adjustable..........new list, 1 25 %

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co.)

Tin Plate.

IC, 10x14, Best Char..	$ 6·50	DX, 12⅛x17, B. Char.	$ 9·00
IX, 10x14, " ..	9·00	DXX, 12⅛x17 " ..	11 50
IC, 12x12, " ..	6·50	DXXX, 12⅛x17 " ..	14 00
IX, 12x12, " ..	9·00	IC, 20x28, " ..	16·50
IC, 14x20, " ..	6·50	IX, 20x28, " ..	20·50
IX, 14x20, " ..	9·00	IXX, 20x28, " ..	25·00
IXX, 14x20, " ..	11 50	IC, 14x20, Best Roof..	6 00
IXXX, 14x20, B. Char.	14 00	IX, 14x20, " ..	8·50
IXXXX, 14x20, " ..	16·50	IC, 20x28, " ..	12 50
IC, 12x24, " ..	6·75	IX, 20x28, " ..	17 00
IC, 14x14 " ..	13 50	IC, 10x14, Best Coke..	5 75
IX, 14x14, " ..	16·50	IC 14x20, " ..	5 75
IXX, 14x14, " ..	19 50	IC, 10x20, " ..	9·0
DC, 12⅛x17, " ..	6·50		

Sheet Iron.	Com'n.	S L U Sm'th.	D. Ref'd Sm'th.	Juni'a Sm'th
No. 16 to 20..........	2·9c	3 8c	5 6c	7·2c
No. 22 to 24..........	3	3·8c	5·8c	7·4c
No. 26..........	3·10c	4 c	6 c	7·6c
No. 27..........	3·20c	4·2c	6·2c	7·8c

Genuine Russia Iron.
Perfect—No. 9, 10, 11, 12.......... per lb. 12⅞c
No. 1 Stained—No. 9, 10, 11, 12..........per lb. 12⅜c
Tare 22 lbs. to Bdle. For less than Bdle. add 1c ℔ ℔.
Patent Planished Iron.
No. 24 to 27, A quantity.......... per ℔.
" B " 9½c
For less than Bdle. add 1c. per lb.
Galvanized Sheet Iron.
Juniata, or 1st quality.......... dis 40 %
Block Tin.
Banca, Large Pigs.......22c | do. Small.......... 26c
Straits, Large Pigs.......19c | Bar.......... 21c
Eng. Ref'd, Large Pig...19c |
Solder.
Extra in Bars..........13c | No. 2, in Bars.... .... 0c
No. 1, in " ....11c | Spelter Solder..... 24c
Pig Lead —Pigs .....5c | In Bars.......... 6c
Antimony.......... 14
Bismuth.......... 2 50
Nickel.......... 2 50
Crucibles.—Dixon's..........℔ No. 4c
Babbit Metal.
No. 1.......... ℔ ℔ 16c | No. 3.......... ℔ ℔ 1⅜c
" 2.......... " 14c | " 4.......... " 7⅞c
Copper.
Brazier's, 30x60, 14 to 100 lbs. Sheets..........28
" " 10, 11 & 12 lbs., " 30c
" " 8 and 9 lbs. " 32c
" " 6 and 7 lbs. " 34c
Tinned, 14x48, 14 and 16 oz..........26c
Planished, 14x48, 14 and 16 oz..........36c
" Boiler Sizes. 14 and 16 oz..........38c
Gutter Copper, 20 and 24x72, 10, 11 and 12 ℔, Sheets 29. 30c
" 14 ℔. Sheets..........28c
Reservoir Copper, 16x60 and 18x60..........30c
Bar Copper, Square and Round, ⅜ to 1⅛ inch..........28c
" " ⅜ inch..........31c
Copper Bottoms..........30c
Soldering Coppers..........3·c
Brass.
Roll, No. 10 to 28, 12 in. in width..........27c
" 30, 12 in. in width..........28c
" 32, 16 " 32c
" 34, 16 ....36c
" 36, 16 ....37c
Platers, No. 40, 6 ....50c

Brass and Copper Wire.

	Brass.	Copper.		Brass.	Copper
No. 0 to 20......	30c	40c	No. 24........	37c	47c
" 21......	33c	43c	" 25........	40c	50c
" 22......	34c	44c	" 26........	42c	52c
" 23......	35c	45c	" 27........	45c	55c

Brass Spring Wire, 2c. ℔ ℔ advance.
Brass Tubing.
Plain to No. 20..........45c | 5-16 inch.......... 5c
⅜ inch..........45c | ¼ " 5c
Copper Rivets and Burs..........dis 10 %
Brass Kettles 7 to 13 inches..........℔ ℔ 35c.
" all sizes over 13 inches.......... " 40c.
Sheet Zinc.—600 lbs. cask.......... " 6¾c
250 lbs. cask.......... " 7 c
Sheet.......... 7¼c
Wire.—Iron, Bright Market..........dis 50 %
Iron, Coppered Market..........dis 45 %
Fence, Nos. 7, 8 and 9..........℔ ℔ 4⅜c
Trellis, Nos. 10 and 11.......... " 4¾c
" No. 12.......... " 5⅜c
Hay Baling, Charcoal, No. 10 and 11.......... " 5⅜c
" " No. 12.......... " 5⅜c
Broom, Tinned, Nos. 18 to 22.......... " 11c
Fence Staples..........per keg 5⅜c
Per lb..........6
Iron Rivets.—Black, papered..........dis 25 %
Tinned, papered..........dis 25 %
In bulk.......new 3-16 ¼ 5-16 ⅜ in. diam.
11½c 10½c 10 c 9½c per lb.
Sad Irons..........℔ ℔ 3⅜c
Enameled Kettles.—Standard Mfg. Co.....dis 50 %
Enameled Sauce Pans.
Standard Mfg. Co..........dis 40 %
Enameled Boilers.—Standard Mfg. Co.....dis 40 %
Dripping Pans.—Smooth Iron..........℔ ℔ 9c
Geneva Fluters..........per doz $13 50
Monroe Fluters..........12 50
Stove Polish.—Dixon's..........per gross 6 00
Gem..........4 50
Japanese..........3 50
Dixon's, in bulk..........℔ ℔ 8c
Coffee Mills.—Parker's..........dis 30 %
Granite Iron Ware..........dis 25 %
Spoons.—New list..........net
Retinned Iron Ware..........30 % off
Plain Stamped Ware..........30 % off
Japanned Ware.—St. Louis list.......... dis
Fry Pans..........dis 50 %
Ears..........dis 50 %

Wiley & Russell Mfg. Co.,

Greenfield, Mass.

Green River Tire Upsetters,
Green River Drills,
Lightning Screw Plates,
Lightning Bolt Cutters,
AND
Other Labor Saving Tools.

FRASSE & COMPANY,

62 Chatham Street, New York.

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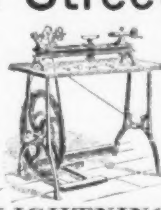
Manufacturers, Importers and Exporters of
Fine Tools & Supplies for Machinists, Blacksmiths and Fine Metal Workers.



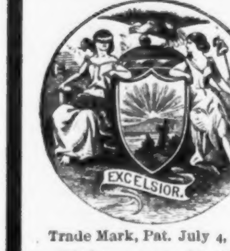
Sole Agents for
Elterich's Celebrated Taps and Dies, Die Holders, Patent Tap Wrenches, and Patent Drill Chucks.
Henry Whiton's Celebrated 2 in. Lever Chuck.
The Briggs Lathe Howell's Turning Lathes, Driving Wheels, &c., &c.

New York Agents for THE LIGHTNING SCREW PLATE.

ESTABLISHED 10 YEARS.

Empire Gum-Core Packing.

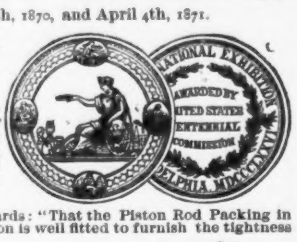
Patented Dec. 27th, 1870, and April 4th, 1871.



Trade Mark, Pat. July 4, 1870.

The First Self-Lubricating Gum-Core Packing.

The only one receiving Medal, Certificate of Award, and Report from Judges at Centennial International Exhibition, at Philadelphia in 1876.



Report of Judges on Awards: "That the Piston Rod Packing in composition and combination is well fitted to furnish the tightness and elasticity required."

We have scores of testimonials from reliable parties who have used the "**Empire**" from **five to ten years**, and give a few samples; but the **best** evidence of its being the **very best in the market**, is the fact that so many unscrupulous parties are **imitating** it as near as they dare, and trying to make sales for their cheap material on the reputation of the "**Empire**," representing to have something equally as good at a lower figure, always making the "**Empire**" the basis of operations.

FAIRMOUNT WATER WORKS, Phila., May 8, 1871.
Messrs. Wm. M. Canfield & Co.—GENTLEMEN: We have now used your Empire Packing in the pumps of these works the past three years. We have run the same Packing without renewal for 18 months; the time saved in stopping to repack has more than twice paid for the Packing used. It is the best Packing ever invented.
JOSEPH MOYER, Engineer.
N. B.—Still in use here, making a service of 10 years.

NEW BRITAIN, CONN., Sept. 24, 1874.
Messrs. Wm. M. Canfield & Co.—GENTLEMEN: Please send us by cheapest freight route, 19 feet 1¼ Empire Packing, same as sent us about two years ago. We have had in use one set of Packing of above size since January 1st, 1873, and when taken out last night was in good condition, and looked as though it would last an indefinite amount of time. We had to remove it in order to make repairs to our engine. Please send above at once and oblige, Yours truly, P. & F. CORBIN.

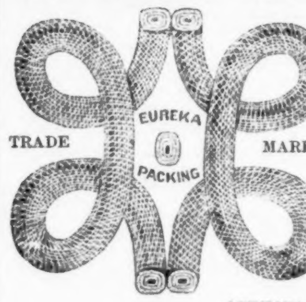
The claims of the "Empire" to superiority are firmly established, and it is fast superseding all other kinds of Packing. It is alike adapted to Stationary, Locomotive and Marine Engines, Hot and Cold-Water Pumps.
☞ Write for new discounts to dealers and consumers.

CANFIELD MANUFACTURING COMPANY,
127 N. Seventh St., Philadelphia, Pa.

True Merit and Excellence are the Basis of all Success.

The Eureka Steam & Hydraulic Packing.

SYMONDS & CO., 120 Exchange Place, Phila.,
Sole Manufacturers.



TRADE MARK.

PHILADELPHIA, April 18th, 1878.
In reply to certain unscrupulous parties who assert that we make their goods a basis to sell our own, we have only to say that such an assertion is too puerile and silly for us to notice, and that, so far as imitating is concerned, we have no desire to imitate an article that has (as far as our knowledge goes) been condemned by three-fourths of such engineers as have given it a trial; nor are we obliged to give our goods various names and prices to effect sales. We intend to maintain in the future the reputation the Eureka Packing has attained, by giving it the same standard of excellence we have in the past; and, further, we would say a *practical test* is a better proof of merit than all the medals ever bestowed. SYMONDS & CO.
Beware of spurious imitations.

OPINIONS OF PRACTICAL ENGINEERS.

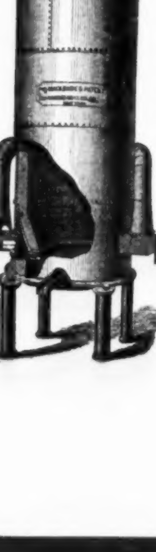
INTERNATIONAL EXHIBITION CO., CENTENNIAL GROUNDS, PHILADELPHIA, Aug. 16th, 1877.
This is to certify that I have used the Eureka Steam Packing on the piston and valve rods of the Buckeye Engines furnishing power for the machinery at the Permanent Exhibition, and I take pleasure in saying that it is an A 1 Packing. I pay scarcely any attention to the stuffing boxes since using it, and they are always tight. The effect on the rods is to make them smooth and bright, and keep them so.
E. H. SCHNEIDER, Engineer.

WASHINGTON, D. C., TREASURY DEPARTMENT, April 22d, 1878.
Messrs. Symonds & Co.—GENTLEMEN: I have been using your Eureka Packing for a year, and in a long experience I find it the most durable and economical Packing for steam and water I have ever used. Respectfully, JAMES VERMILLION, Chief Engineer.

Office of LEHMAN & BOLTON, Philadelphia, June 11th, 1877.
Messrs. Symonds & Co.—GENTLEMEN: In reply to your inquiry in regard to how your Packing performs, I am happy to say I find it A No. 1. I have used every kind of Packing that has come to my knowledge, in an experience of many years as engineer, but have never used or found anything of its kind that has given me as good satisfaction. I most cheerfully recommend it to all engineers who desire a good Packing.
SAMUEL FISH, Engineer, Goldsmith Hall.

WICKERSHAM & CO., Sole Agents, 59 South Fourth St., Philadelphia.
JOHN MILES, MILWAUKEE, WIS., Traveling Salesman.

THE MACKENZIE PATENT CUPOLA & BLOWER.



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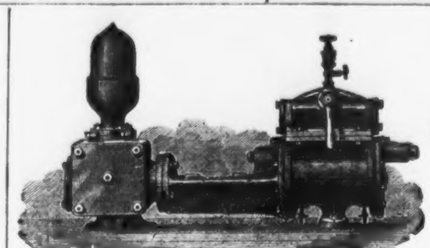
Smith & Sayre Mfg. Co.,
PROPRIETORS, 21 Cortlandt St., New York.

This Cupola has made a great revolution in melting Iron. It differs from all others in having a CONTINUOUS TUYERE, or in other words, the blast enters the fuel at all points. Above one ton capacity per hour, they are made *oval in form*. This brings the blast to the center of the furnace with the *least resistance* and *smallest* possible amount of power, and in combination with the continuous Tuyere causes complete diffusion of the air throughout the furnace, and uniform temperature, melting *ten* or *fifteen tons* an hour with the pressure of blast required to melt *two* or *three tons* in an ordinary Cupola. It also enables us to save very largely in *time* and *fuel*, the experience of our customers showing a gain of *twenty-five* to *fifty* per cent. in *time*, and *twenty-five to forty* per cent *fuel* over the ordinary Cupola, and a BETTER QUALITY OF CASTING, especially in light work. This is due to the thorough diffusion of the air, and more perfect combustion, extracting less carbon from the iron, making a softer and tougher casting.
We manufacture these Cupolas of any desired capacity, numbered from 1 to 20, inclusive, the numbers indicating the melting capacities in TONS PER HOUR—No. 1, one ton; No. 2, two tons; No. 3, three tons per hour, and so on up to 15 or 20 tons. We have *improved* the *construction* of these Cupolas in every way, have increased their strength and durability, and sought to make them as convenient for working and repairs as our own, and the experience of our customers, could suggest.



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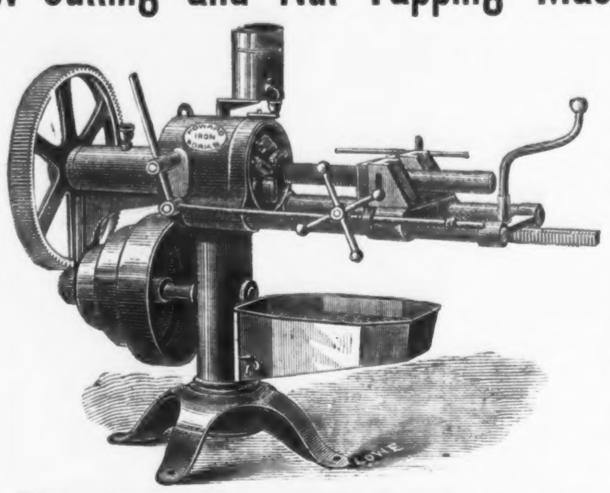
PATENT
"SPECIAL" STEAM PUMP

Is the Standard of Excellence at Home and Abroad.
For reduced price lists address **A. S. CAMERON, East 23d Street, New York.**

SCHLENKER'S

Screw Cutting and Nut Tapping Machines.

No. 5 cuts from ¼ to 1¼ inches, price......$250
No. 5½ " ⅜ to 2 " 350
No. 6 " ⅜ to 3 " 700
No. 8 " ⅞ to 3 " 500
No. 4 (Double Header) cuts from ¼ to ⅞ inch, price, 350



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Send for complete (illustrated) catalogues.
Cuts 300 ¾-inch Bolts, 2 inches each, in one hour.

This engraving represents a No. 5½ Machine, and cuts from ⅜ to 2 inches.
MANUFACTURED BY THE
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BEECHER & PECK,

Successors to Milo Peck (deceased), Manufacturers of

PECK'S DROP PRESS

Newspaper Directing Machines, &c.

Special attention given to the making of all Drop Dies.
Special machinery fitted up to order.
New Haven, Conn.

MANUFACTURERS' SUPPLIES.

The Best and Lowest Price.
H. A. ROGERS,
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A few doors from Broadway.

Steam Gauges, Belting, Chucks, Drills, Packing, Governors, Jacks, Oil Cups.
STEAM PUMPS for Pumping, Fire Purposes, and Boiler Feeding.
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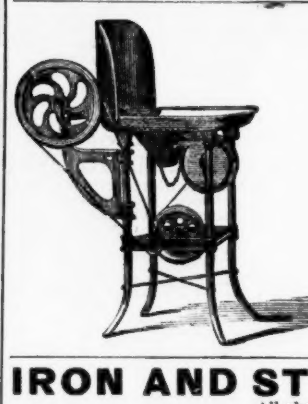

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Several sizes and 20 styles, for every purpose from the lightest to the heaviest work. Also
PRESSURE BLOWERS
AND
EXHAUSTERS.
Sizes from six inches to six feet.
Send for catalogue.
K. P. F. Co.,
218 Carter Street, - Philadelphia.

IRON AND STEEL DROP FORGINGS

All shapes, small and large, including
Gun, Pistol, Wrench Bars, &c Also, Die Sinking. Manufacturers also of Bricklayers', Moulders' and Plasterers' Tools, Saddlers' Round and Head Knives.
WILLIAM ROSE & BROS.,
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Manufacturers of the following *Patented* Articles of
MALLEABLE IRON:

Hammer's Adjustable Clamps.
Hammer's Malleable Iron Oilers.
Hammer's Mall. Iron Hand Lamps.
Hammer's M. I. Hanging Lamps.
For Sale by all the principal Hardware Dealers.

Malleable Iron Castings
Of superior Quality and Hardware Specialties in Malleable Iron made to order.

STEAM ENGINES,

Vertical or Horizontal.

Combined, as in cut, 2 to 12 H. P., or on independent beds, **2 H. P.** upwards to **200 H. P.** *Plain* or with *Automatic Variable Cut-off.* We can refer to hundreds in use, of all sizes, giving perfect satisfaction.

Yacht Engines and Steel Boilers, Shafting, Pulleys, Hangers, &c.
Send for pamphlet, stating where you saw this, to
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P. BLAISDELL & CO.,

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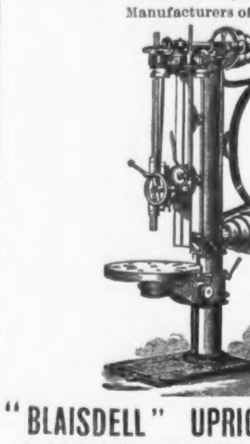
Manufacturers of the



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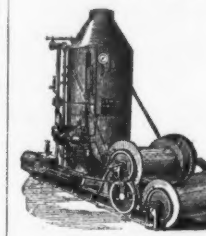
Adapted for Mines, Dock Building, Pile Driving, Quarries, &c.



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H. L. Shepard's
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LATHES,
Drill Presses,
Scroll, Circular and Band
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Also FITTINGS of all kinds.
2 horse-power engine and boiler complete, $150; 4 horse-power engine and boiler complete, $250.
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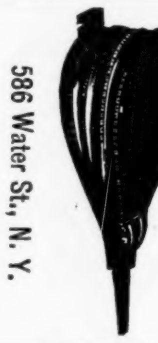

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It is a common method to advertise Governors *without cost*, unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in accuracy and durability—the main essentials—we guarantee it shall do more.

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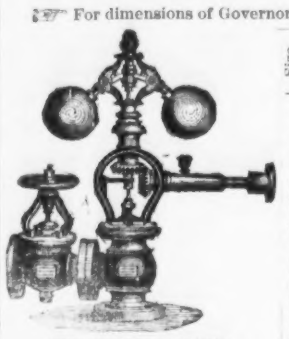
FEBRUARY 1, 1877.

☞ For dimensions of Governor, see Illustrated Price List.



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Improved Steam Governor.

Size, Inch.	Plain.	Bright Finished.	Extra for Spe'd'r	Stop Valve.
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1¼	23.00	26.00	2.25	6.00
1½	26.00	30.00	2.50	8.00
2	31.00	35.00	2.75	10.00
2¼	36.00	41.00	3.25	12.00
2½	40.00	45.00	3.50	14.00
2¾	45.00	51.00	3.75	16.00
3	50.00	57.00	4.25	19.00
3½	59.00	67.00	4.50	23.00
4	69.00	78.00	5.00	28.00
4½	80.00	90.00	5.50	34.00
5	90.00	101.00	6.00	40.00
5½	105.00	117.00	6.50	46.00
6	120.00	133.00	7.00	54.00
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8	175.00	192.00	9.00	79.00
9	198.00	218.00	10.00	....
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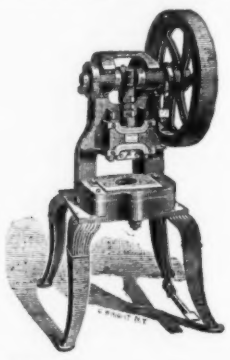

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FOR WORKING SHEET METALS, &c.

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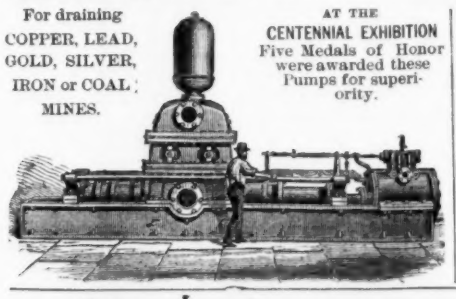
For draining COPPER, LEAD, GOLD, SILVER, IRON or COAL MINES.

AT THE CENTENNIAL EXHIBITION Five Medals of Honor were awarded these Pumps for superiority.



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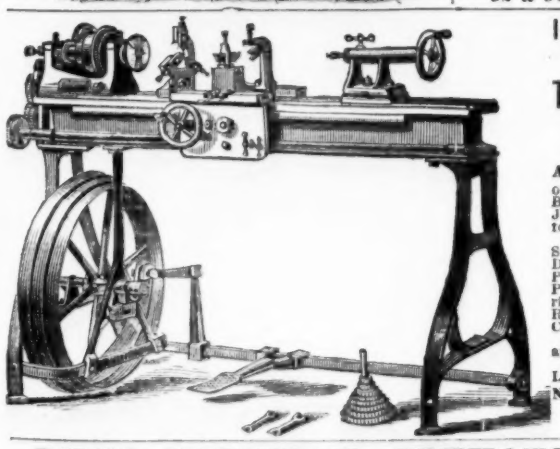

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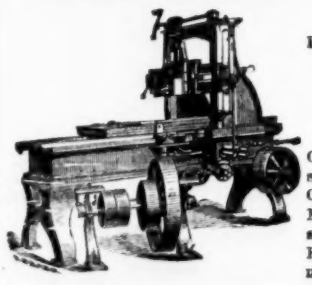

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Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.

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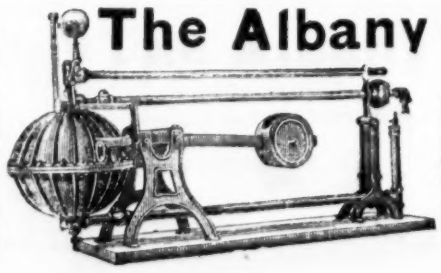

This Trap automatically drains the water of condensation from ***Heating Coils,*** and returns the same to the Boiler *whether* the Coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

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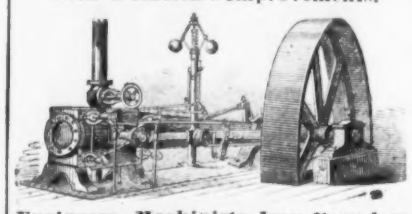

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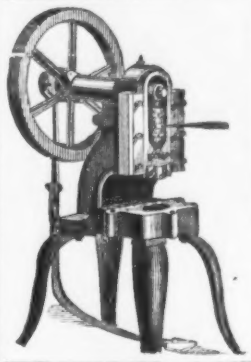

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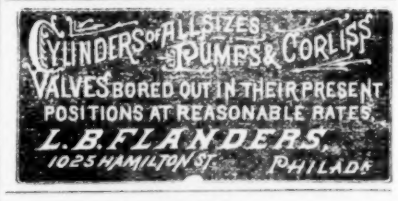

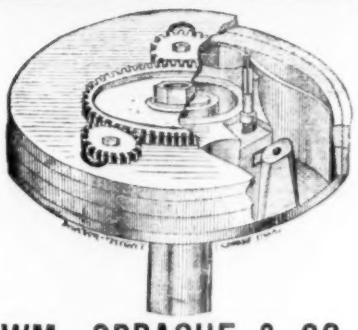

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XXX Genuine	35c	C	17c
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A	25c	F	10c
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"Note."—The above are my standard mixtures, and have given satisfaction wherever used, but I am repared to make Anti-Friction Metal of any quality or mixture desired by the purchaser.

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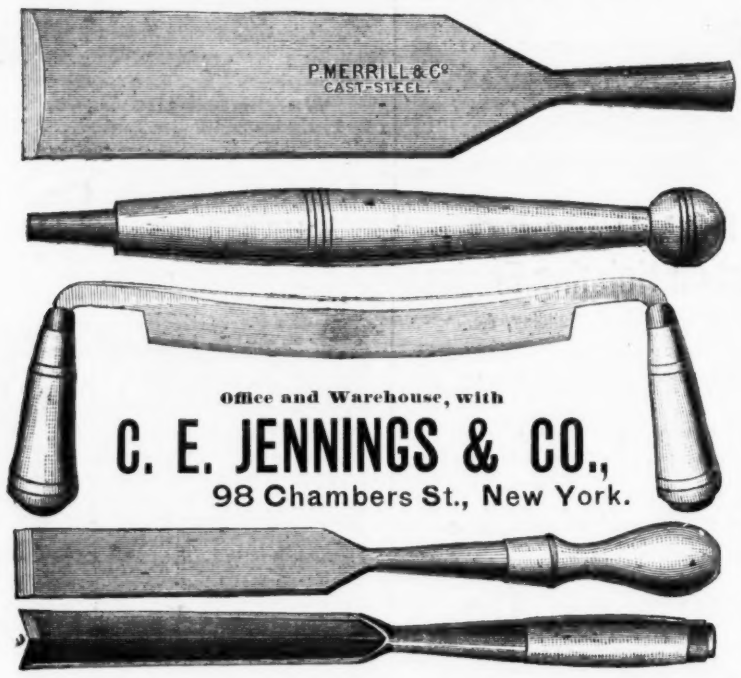

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We desire to call special attention to our New JOINERS' POCKET BLOCK PLANE. We believe this tool when once seen will speak for itself more pointedly than anything we could possibly say. It is simplicity itself, both in construction and operation, and the nicest working tool ever made, and specialally recommended for amateurs, pattern makers, light scroll saw work, etc., etc.

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No. 12, 4½ in. in length, 1¼ in. cutter, japan'ed finish, polished trimmings	$0.85	$10.00
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For connecting Shafting and Gearing.
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See cut of Elevator Hoisting Machine in issue of May 16, 1878, page 39.

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TRIAL OF THE IMPROVED LIGHTNING SAW.

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"BOYNTON'S SAWS were effectually tested before the judges at the Philadelphia Fair, July 6th and 7th. An ash log, eleven inches in diameter, was sawed off, with a four-and-a-half-foot lightning cross-cut, by two men, in precisely six seconds as timed by the chairman of the Centennial Judges of Class Fifteen. The speed is unprecedented, and would cut a cord of wood in four minutes. The representatives of Russia, Austria, France, Italy, Spain, Belgium, Sweden, England, and several other countries, were present, and expressed their high appreciation."

Received Medal and Highest Award of Centennial World's Fair, 1876.

$1000 Challenge was prominently displayed for six months, and the numerous saw manufacturers of the world dared not accept it, or test in a competition so hopeless.

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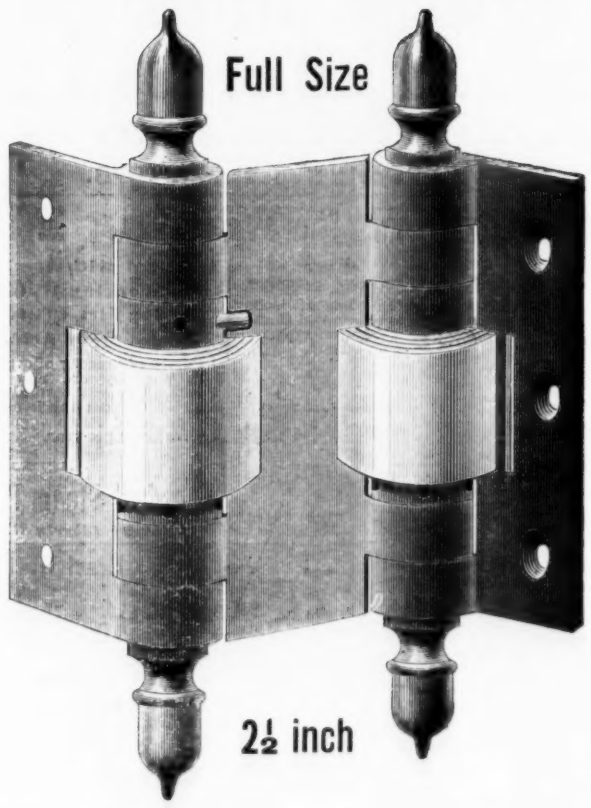
FOR

SCREEN DOORS.



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